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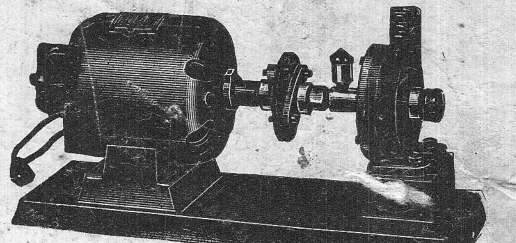

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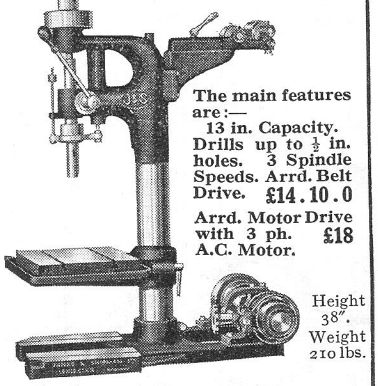

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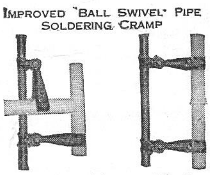

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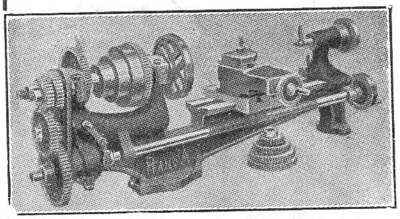

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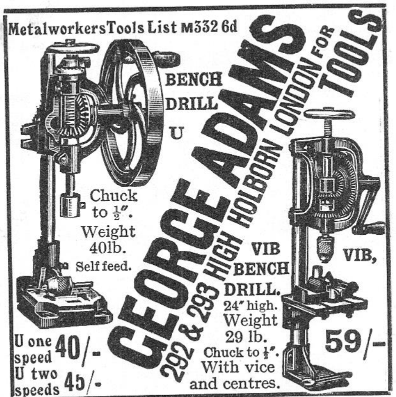

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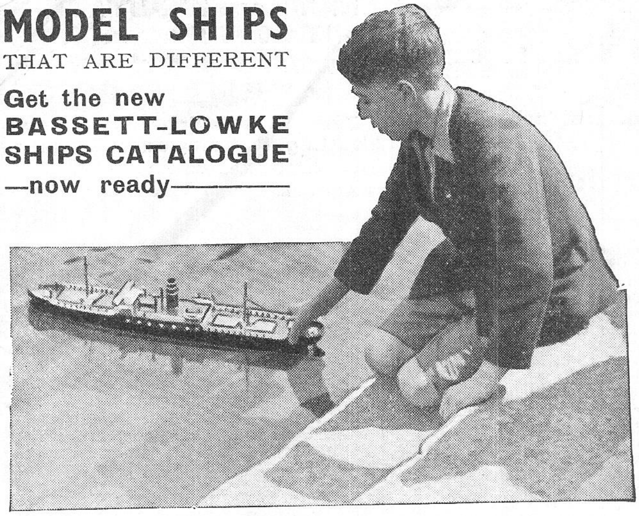

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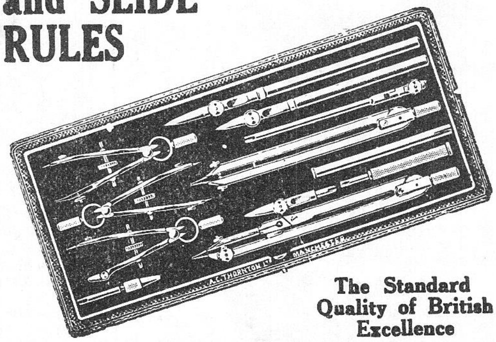

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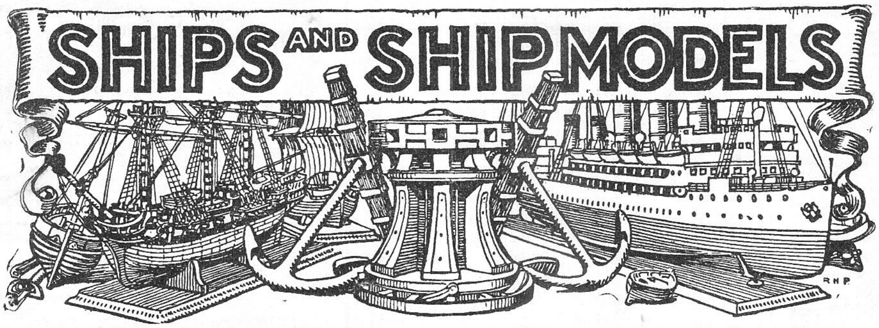

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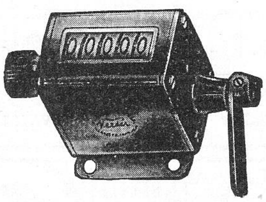

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SMOKE RINGS

Another Exhibition Prize.

I AM pleased to report another generous offer of a prize for our Exhibition. This comes from Major W. L. Sparkes, who has given £2 2s. to be awarded to a really meritorious piece of "O" gauge work — loco. or vehicle — by a genuine beginner. Model railway competitors have a splendid prize list awaiting them, and I hope the entries will fully come up to the expectations of the generous donors. I have just received the cup offered by Admiral Sir Reginald Bacon, K.C.B., for the best piece of amateur work in the whole of the competition section. It is a beautiful trophy, and will be a distinct encouragement to the real amateur craftsmen.

* * *

A Schoolmaster's View.

MR. GUY H. ROOKE, Headmaster of Walkley Council School, Sheffield, whom I well remember as one of the earliest readers of the "M.E.," recently stated that his interest in engineering has always been a means of close contact between him and his boys during his 41 years' service with the Sheffield Education Committee. Mr. Rooke is shortly retiring, and in his well-earned leisure I hope he will spend many happy hours in his own well equipped private workshop. I wish there were many headmasters like Mr. Rooke.

* * *

Spare Time Problems.

SEVERAL readers have written me to say that they have been entertained by our "Spare Time Problems," but I do not know how far this appreciation extends. Will those who would like to see this feature continued kindly send me a post-card? I should be glad also to have any interesting problems, with solutions, which my readers may think worth including in the series. I am indebted to one reader for the clock problem in this issue.

* * *

Model Yachting at Weston-super-Mare.

IT is reported that the District Council of Weston-super-Mare have accepted a tender for the construction of a second model yacht pond on the South Shore. The cost is to be £1,448. This is a welcome sign of the growing interest in model marine matters. No seaside or holiday resort should be without its model boating lake.

* * *

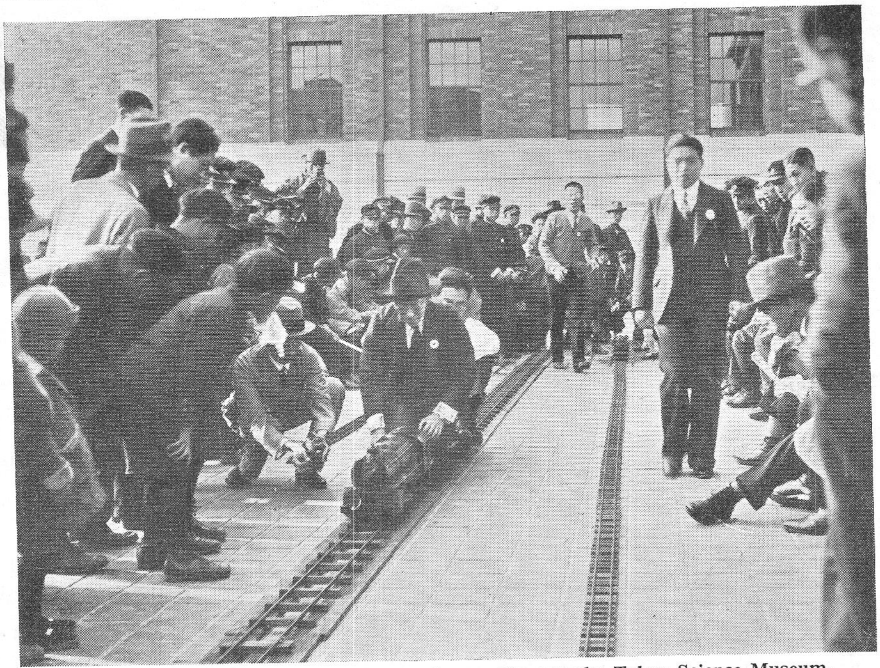
A Hobbies Exhibition at Wembley.

I HEAR that the Wembley Juvenile Organisations Committee are arranging a hobbies exhibition in connection with their "Week of Youth" to be held from September 8th to the 16th. The exhibition will be held on Saturday, September 8th, at the Wesleyan Hall. Full particulars may be obtained from Mr. F. E. Griffiths, Council Offices, Wembley.

* * *

An Old Reader Passes.

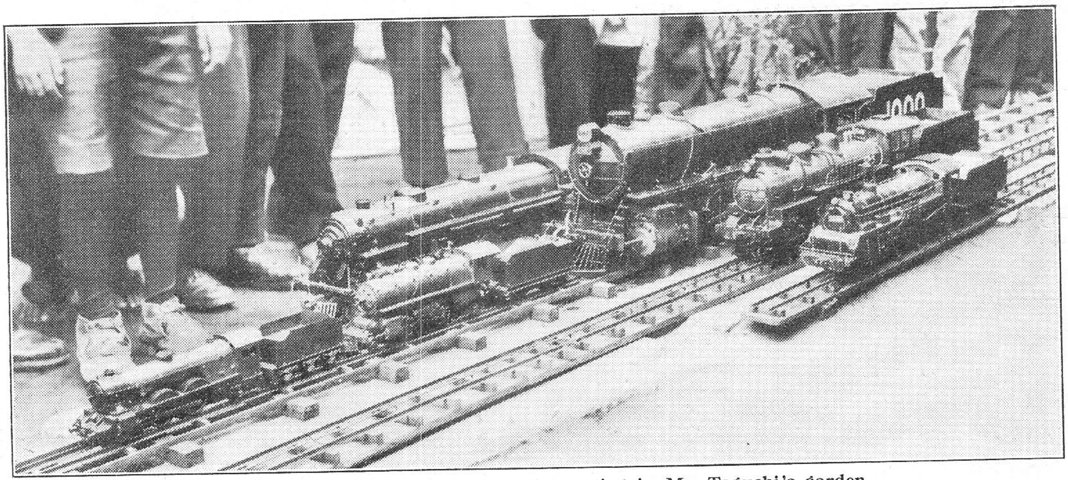
I AM sorry to learn of the death of Mr. Thomas Bowker, of Settle, who passed away last month at the age of 77. Mr. Bowker had a life-long interest in practical mechanical work, and his model engineering abilities assisted his advancement in the service of High Mill at Langcliffe, by which concern he was employed for



A Lecture and Display on Model Steam Locomotives at the Tokyo Science Museum.

57 years. He contributed an article on an excellent horizontal engine to No. 7 of THE MODEL ENGINEER, published in July, 1898. When he retired from active work he occupied the position of foreman of the mechanics' shop at the Mill.

* * *



A collection of model locos. at a club meeting in Mr. Taguchi's garden.

Miniature Locomotives in Japan.

I REPRODUCE two photographs this week which indicate very clearly the growing interest in miniature locomotive building in Japan. One of these shows a meeting of the newly-formed Japan Miniature Railway Club which was held a few months ago at the Science Museum, Tokyo, and the other picture shows some of the models belonging to the members. The Club meets regularly every third Sunday in the month, and in addition to model building, visits are paid to railway works and other places of technical interest. The office address of the Club is c/o Mokei Tetsydo-sha, No. 10, 3-Chome, Shinogawamachi, Ushigome, Tokyo, Japan. I am indebted to our old correspondent Mr. Takejiro Taguchi for this information, and I hope he will convey to the members of his Club the best wishes of the model engineers of Great Britain for their success. I have no doubt our Japanese friends would appreciate any photographs and correspondence which other model railway engineers would care to send them.

Percival Marshall

SHOPS SHED & ROAD

A Column of "Live Steam."

By "L. B. S. C."

Australia Will be There—

When it comes to putting a good job of work into a little locomotive ! Our pictures this week show the latest effort from the opposite side of the world, a 2½″ gauge 4—8—4 being built by Messrs. Quaife and Barron, of Brisbane, Queensland, to Mr. A. Josslin's "Uranus" blueprints. In passing, it is worth noting that the miniature locomotive-building fraternity are not nearly so superstitious as their "full-sized" confreres, as the name "Uranus" is taken from the unlucky star, yet brother Josslin's "Uranus" design is about the most popular of the whole series ! The personal appearance of the engine is most certainly imposing and symmetrical ; her proportions, whilst appealing to all good folk of the same mind as our old friend Bill Massive, are not in any way "freakish," which is more than can be said of many "outsize" efforts I've seen ; and as Mr. Josslin believes in Live Steam gospel and monkey-gland valve setting, she should be able to pull and go in the manner her appearance suggests.

Brothers Quaife and Barron have followed the blueprints pretty closely, the only variations being more or less due to circumstances arising out of the job itself. For example, the bore of the middle cylinder was increased from ⅞″ to 1″ in order to clean out a small blow-hole in the casting. The piston-valve chests are 1/64″ oversize ; trouble was experienced with the ⅜″ reamer, and a special cutter eventually had to be made, with which a true bore was obtained. The valve crosshead guides, however, are not made to the original design, but are bored like a trunk guide on a launch engine, see photo., and are in one piece with the back steam-chest covers. With the exception of the wheels, which are Kennion's castings, all the castings and parts are the builder's own work, a complete set of patterns being made before the job was started. The cylinders are cast iron, and the pistons have two rings each, turned eccentric, and double-tongued, the pistons themselves being made in three pieces, as it was not found possible to get the rings over a solid flange.

The pictures show the progress of the engine up to last May. It will be noticed that the two centre pairs of coupled wheels have no flanges, so that in spite of her great length, the engine will be able to run around curves of quite moderate radius. My old caterpillar 4—12—2 also has two pairs of blind wheels and she can go around a 25 ft. circle, although engine and tender form a unit just over four feet long. I shall be looking forward with great interest to hearing about the trial runs of the Brisbane "Uranus" and offer our Australian brothers hearty congratulations on the excellent job they have made of it so far.

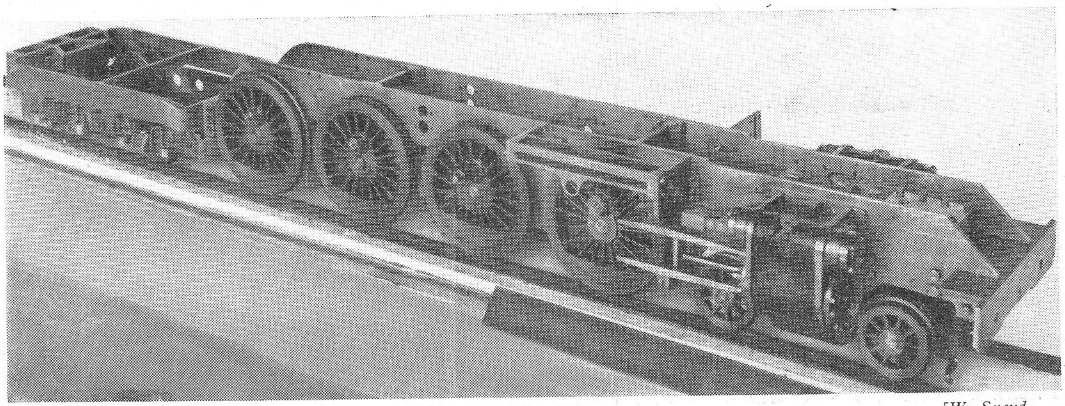


Photo by] An Australian "Uranus." [*W. Sneyd.*

These Little Things are sent to Try Us !

Whether the hot spell, or the drought, or some allied circumstance has anything to do with it, I'm not in a position to say ; but many brother loco. men just recently seem to have been plagued by silly little things which have properly upset the working of their engines, and spoiled their enjoyment. For example, an old friend who brought an engine around for a run on the Polar route, said his injector was made according to the "words and music" but so far had persisted in putting all the water on the right-of-way instead of into the boiler ; he had done all in his power to correct matters, but to no purpose. Suspecting where the trouble lay, I surreptitiously changed the delivery cone for one of my own

—a matter of a few minutes' work. We got up steam, and the engine started to blow off with about $\frac{1}{16}$" of water in the bottom of the glass. My friend was about to make vigorous use of the hand pump, when I said "Half a jiff, let's see if the injector will work for me." Water was turned on, and the steam valve opened; and a hiss and splutter, followed by the old familiar chirping squeak, the instant shutting down of the safety valve, and the water rising in the gauge glass, proclaimed to all and sundry that the "jigger was jigging" well and truly. There was a little water escaping at the overflow, but the water cock was in an awkward position (where it had been hastily fitted for test purposes—the tender belonged to another engine) and could not easily be regulated, otherwise the dribble could have been stopped. We kept the engine in steam for nearly an hour-and-a-half, during which time the injector supplied the boiler's needs, starting instantly steam was turned on, and not "knocking her stony" all the time there was plenty of fire. My friend was astounded, in view of his previous experience!

The Mystery Solved—and the Moral.

The cause? a little thing—literally! The drill with which he drilled the throat of the delivery cone had not been correctly ground, nor apparently had it been run fast enough; consequently the hole was sufficiently large to pass a No. 61 drill, whereas the correct size for that particular jigger should just pass a 64 drill a tight fit. The cone I put in had the right sized hole in it, and made all the difference between success and failure. Speaking of holes and cones, I've had dozens of letters re injector failures and have been assured that they were made to instructions, using right sized drills, correctly tapered reamers, and so on and so forth; but all those I've put to rights—and they are many—have definitely *not* been in exact accordance with the "label on the bottle." When corrected, they worked, without a single exception. At a Club meeting in London, a member was heard to remark that he had a box full of "L.B.S.C." cones, and none of them were any good. He was wrong; what he had was *not* a box full of "L.B.S.C." cones, but *of his own and other folks' attempts to make "L.B.S.C." cones*—which, as the proverb says, "is a horse of another colour, and not a winner." I can tell you *how* to do a job, but how the merry dickens am I to guarantee that you'll do it, and do it correctly? Moral—there's a vast difference between a copy and a caricature!

Reversing Gear on the Steam Gauge.

Another engine wouldn't steam. Boiler and firebox big enough to supply four cylinders instead of two; smokebox guaranteed O.K. in every respect—blastpipe, blower, chimney liner properly set out and all right sizes; no air leaks. Cylinders and motion good, valve setting correct. Steam from all cold in three minutes; good sharp exhaust; but a falling steam gauge needle as soon as the regulator was opened. What about it?

If an engine will get up steam from all cold in three minutes, there isn't much wrong with the smokebox, grate, nor ashpan; but as this was done by aid of an auxiliary blower, it didn't need a Sherlock Holmes to deduce that the trouble lay in the engine's own blastpipe nozzle, and maybe in the blower jet as well. I yanked out the blast nozzle, and there it was! This most important component was made from a bit of soft hexagon "screw-rod"; quite a suitable material, but the snag was that the amateur-ground drill used to make the hole, had cut large and wandered slightly in the soft metal. Consequently, although the nozzle *appeared* to be correct, and a piece of rod dropped down it, stood in the centre of the chimney, the steam actually emerged slightly on the shew-whiff with a sort of whirling motion, diffusing sufficiently to catch the bottom of the liner and spread out in the smokebox, partially destroying the vacuum. I tested it with smoke blown through from a piece of smouldering rag. In addition to this, one of the jets of the ring blower was shooting directly at the lower edge of the liner, or petticoat pipe. A new blast nozzle was made, the hole being drilled under size, and then opened to correct dimensions with a taper broach poked down the chimney, after the nozzle had been screwed home. The offending blower jet being merely a hole in the ring, was blocked up, and the two remaining holes left to carry on the good work. Result—start the engine with 40 lbs. on the "clock" and she goes up to 80 in 100 ft. of run, and keeps blowing off all the time with the pump on! What a trivial thing—but *what* a difference it makes!

I could go on for hours, and tell you of failures caused by a mechanical pump, which worked fine when cold, yet refused to feed the boiler under steam; a minute crack in the centre tube of a water-tube boiler which just permitted enough steam to escape, to check the draught and prevent free steaming; an oil supply which flooded one cylinder and starved the other; a fire which would only burn at one end of the box; an engine which would steam and pull like the dickens for fifteen minutes or so, and then suddenly "lay down and die"; a gauge glass which wouldn't show any water level at all, although perfectly clean; and cylinder and motion ailments by the score. However, space grows short, so I'll conclude this little dissertation with a word of advice especially for tyro brothers. You know the old saying about it being the unexpected that always happens; well, when you get a mysterious engine failure, look for the thing you least expect. Sounds a bit like our old friend Patrick, but I can't think of a better way of putting it. In my own case, I always look for the thing nobody else suspects—and usually find it!

"Cockyette."

About umpteen dozen brothers who follow these notes have been shooting off strings of queries about proposed L.N.E.R. 2—8—2's in all gauges from "O" upwards. In order to save a lot of direct correspondence I'll deal collectively with a few of them here. I must confess to having enjoyed one large-sized chuckle, the writer of one of the letters being a brother who admits open undisguised hostility to the personal appearance of the average American and Canadian engine, yet opines that Cocky is a thing of beauty; it is, of course, a matter of personal opinion, but I'd prefer the "Queen of the Blobs and Gadgets" any day. Cocky is, however, a steam locomotive built to do a job and not to look at; if she performs as expected, here's one who will treat her with the respect she has earned. Handsome is, as handsome does!

Re the queries, the underworks of a Cockyette need not be any different to an ordinary type of engine, from gauge "O" to 3½″; frames, axleboxes, wheels, etc., being of the usual pattern. In gauge "O" I should advise two outside slide valve cylinders with loose eccentric gear; in gauge "1" three slide valve cylinders with loose eccentric gear; in 2½″ and upwards, three poppet-valve cylinders, the valves being driven by a camshaft actuated by gears in a manner somewhat similar to those on the big engine. 2½″ gauge engines would only need plain little valves something like those of an automobile engine, and they could easily be arranged in a cast steam-chest with drilled inlet and exhaust passages. The camshafts call for no great ingenuity; two early cut-off points in addition to full gear would be plenty, whilst the exhaust point would be constant. I was going to build a 2½″ gauge poppet-valve locomotive awhile ago, and made a sketch of "the works" at the request of the client-friend who wanted it, but circumstances beyond my control caused the job to "slide." I still have the sketch floating around somewhere or other, and if I can find it, will publish same, as it would do fine for "Cockyette." Of course, slide-valve or piston-valve cylinders could be used in any gauge, with outside motion, which, I understand will be fitted to No. 2 of the full-sized family. Another stunt I once schemed out was three cylinders all in one piece, with three valves operating in a single steam chest, which could be arranged either above or below the cylinders. This also would suit "Cockyette," as the valve gear could be kept within the frames, and dummy outside cardan shafts fixed up for the benefit of Inspector Meticulous and all his relations.

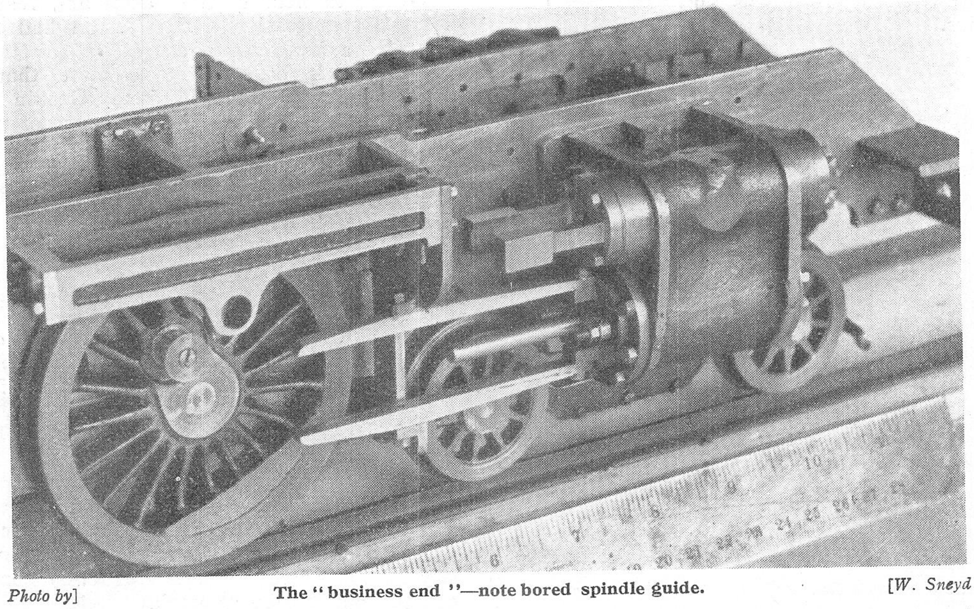
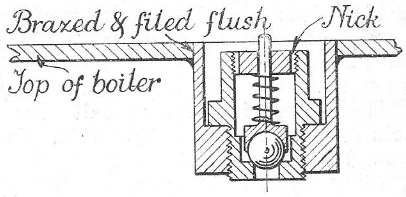


Photo by] The "business end"—note bored spindle guide. [W. Sneyd



Safety valve for "Cockyette."

The principal point of apprehension seems to centre around the boiler, but here I see no difficulty at all. If I were building a "Cockyette" (have already been requested to do so in gauge "O," 2½″ and 3½″!) I should make the boiler, from the backhead to the smokebox tubeplate, just like an ordinary boiler of the "Fayette" pattern, with parallel barrel and combustion chamber. These are the fastest steaming and most reliable boilers I have so far built, and would give a good big barrel with plenty of steam space, the "scale size" firebox being ample for three "scale" cylinders working all-out. Neglecting smokebox for a minute, and considering the boiler only, the circular barrel of the boiler mentioned above would not be a great deal different in appearance from Cocky's boiler over the lagging; no dome is necessary, as any type of "domeless" regulator or throttle described in back notes could easily be applied, and the safety valves sunk into the barrel as sketch. The turret could be arranged on the backhead inside cab, with the rest of the fittings as usual.

The smokebox also presents no difficulty. I should use a piece of tube with a segment sawn off it and a flat piece brazed on, the wind-deflector arrangement being separate, something like the original. In the smallest size, a single chimney could be used, but in the larger sizes, a double one as on big sister with two blast pipes; but don't get trying any experiments such as connecting one cylinder to one blastpipe, and another to the other, or when one puffs it will draw air down the other, instead of through the firebox. Both blastpipes should be common to all three cylinders, so that they puff together, and have the same effect as a single blastpipe and chimney. The only object of the double stack is to provide freer exit for the products of combustion (gee-whiz, doesn't that sound scientific—I'm surely improving!)

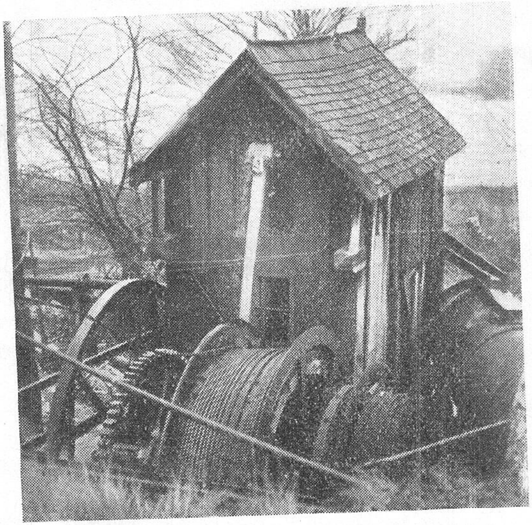
Regarding details, mechanical lubricators would certainly be advisable, and could be arranged on the running board as on the big engine, with a drive from the coupling-rod pin. There is plenty of room between the third and fourth coupled axles for a pair of axle-driven boiler feed-pumps, of the kind specified for my "Princess Royal" and "Kingette" engines, and described in back notes; and an injector could be arranged underneath the footplate, so Cockyette shouldn't go thirsty. External trimmings can, of course, be added to taste. Well, I guess the above just broadly covers the queries I have received, except for actual figures; anyway, I have noted requests for these, and I hope to wangle in one or two experiments and get some data.

A 150-Year Old Beam Engine.

A Remarkable Old Engine Still at Work in Shropshire.

We are indebted to the Prestage and Broseley Tileries Co., Ltd., of Broseley, Shropshire, for the accompanying photograph of a remarkable old beam engine, which is still at work in one of their clay pits. The following description is taken from an article recently published in the "Shrewsbury Chronicle."

"One of the oldest engines in the country is still working at the Prestage and Broseley Tileries.



The old beam engine used for driving a pit cage.

The engine was used to sink the shaft of what is known as 'the deep pits' at Broseley about 150 years ago, and it has driven the pit cage ever since. Apart from the fact that it was made at the Broseley Foundry, no one knows who made it or the exact date of its construction. It is well known that stationary steam engines, designed by Watt, were made at Broseley years before the first locomotive was made, and this is the last working survivor of these engines, though others of the same type have been dismantled and broken up within living memory.

The engine is an 'All Broseley' product. Every part is of cast iron, locally cast and smelted from iron ore mined in the locality. There was a rust resisting quality about Broseley iron made at that time, for the drum, which, as the picture shows, is uncovered and has always been so, is not in the least corroded. Only one of the original parts has had to be replaced.

Owing to wear of the piston and resultant loss of compression a new piston had to be installed a few years ago.

Here it is of interest to state that the original piston had 2¼ inch Gaskin rope wound round it to serve the purpose of piston rings. In spite of that, the engine went as well with the old piston as with the new one.

But it is not merely as a curiosity and a relic of a past age that the engine is celebrated. It is still going strong and answers its purpose as well as the modern steam engines at the head of the company's three other shafts.

The shaft it works goes down to a depth of 150 yards, and is believed to be the deepest clay pit in the country. The seam of tile clay lies 100 yards below the surface, and from here the engine can raise a load of five tons of raw material.

The seam of sulphur coal above the tile clay was worked out years ago, and this also was brought to the surface by the motive power of the engine. Engineers and university lecturers and students frequently come to see the old engine at work.

It runs with astonishing smoothness, and with an absence of noise which would put many an old motor-car to shame. Its surroundings are striking, and somewhat of the 'Heath Robinson' order.

There is a personal association with this engine, too, for it was in the charge of Mr. Walter Roberts, of Broseley, for 50 years, and now his son, Mr. H. Roberts, has charge of it. The engine was also at one time in possession of the Guests, of Broseley, a family widely known in the industrial world, particularly through the firm of Guest, Keen and Nettlefold."

WORKSHOP TOPICS

Renovating an Old Lathe.

By GEORGE GENTRY.

(*Concluded from page* 104)

THE remainder of the work was easy, but lengthy, in that each counter-sunk head screw is fitted with a tubular distance piece to bring the rim out clear of the wheel, and each distance piece is set to counter-bored flats on rim and spoke, and adjusted for thickness to set the rim running dead flat as well as concentric.

Nothing was done to the hardwood pitman, but, as seen, the double foot treadle is fitted with an oak board (a large block backing) about 18 ins. by 10 ins. by ⅞ in., fixed by three bolts through holes in the cast iron feet, and tilted at the back on a strip of hardwood, on edge, to reduce its dead centre elevation. The treadle gear thus constituted runs noiselessly and sweetly, and drives the lathe on the slow gear almost as well, and certainly more noiselessly, as if with double gear. Now about the lathe itself.

The Bar-Bed Lathe and its Accessories.

Fig. 2 shows a close-up of this. The bed, where full section, is equilaterally triangular, of cast-iron, finished machined 1⅞ in. wide on each face. It is about 20 ins. long overall, and takes, as seen, but with tailstock right back, over 10 ins. between centres. Ultimately, and if necessary, on occasion, it will be possible to shift the tail foot inward 2 ins. on a wood bracket, and then by mounting the tailstock outside it, the available centres will be over 12 ins. Briefly, what has been done to the lathe is that the irregularly slotted top to the bed has been planed along, making for that length the swing of the lathe 6⅝ in., and which was originally under 6 ins. This irregular slotting appears to have been done to clear discs or wheels in certain places. The headstock alignment, which pointed upward and backward of bed parallel, has been corrected; a steel centre driver chuck made right out with an adjustable silver steel driver, and a steel head centre set-screw locked. It runs dead truly. The slide and hand rest saddle (to be mentioned later) has been rendered more capacious and fitted with a beautiful little 2½ in. Britannia Company's compound slide rest (purchased through the "Smalls" of the "M.E." advertisements). The tailstock has been bored out to oversize but to true alignment and fitted with a steel bush. The first boring was to ⅝ in. minus, and this was reamered out to ⅝ in. by that size

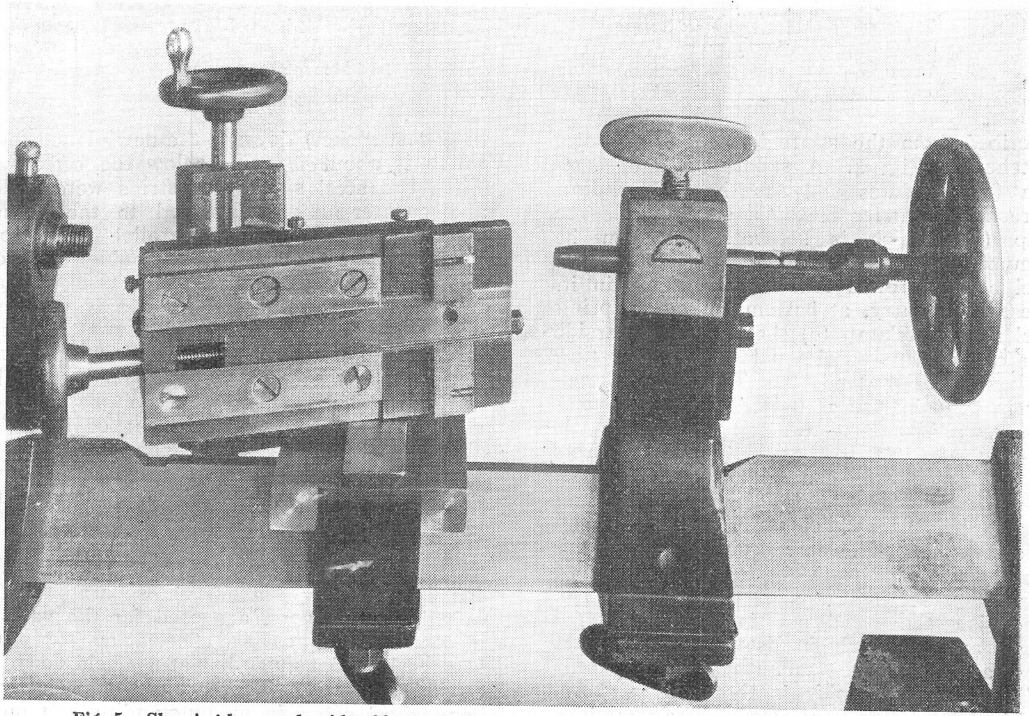


Fig. 5. Showing how underside of base of slide-rest was vee planed and fitted with steel vee strips.

hand reamer. The boring was done by an overhanging boring bar held in a dead true S.C. chuck previously fitted (mentioned later). To this was fitted a length of ⅝ in. steel tube, a push fit. Tube chosen was ⅝ in. by No. 12 S.W.G. Thus: .625 in. – 2 × .104 in. = .625 in. – .208 in. = .417 in. As the original bore of 7/16 in. = .4375 in. was adhered to, there were some 20 " thou." to be cleared, and which was done by the same boring tool, and followed by the 7/16 in. hand reamer held in the chuck.

Another job was the fitting of an all-steel 2¾ in. " Crown " single-pinion geared scroll chuck, with two sets. Seen mounted in Fig. 3, and purchased from Messrs. S. Tyzack and Son, Ltd., 341-45, Old Street, E.C.1, for something under 30s. It, so far, runs and holds dead true for all diameters tested.

One of the most interesting things about the lathe was, and is, the mounting of the original hand-rest, seen with additions in Fig. 3, and described from the approximate half full-size sketches in Fig. 4. A saddle piece of cast-iron (a) straddles and fits the bed, sliding thereon. It carries at top a steel double vee strip (b), which is separate, but can be clamped down by a pair of 5/16 in. Whit. steel bolts, screwed and riveted at top in it. These bolts carry, at bottom, a bowed spring steel rubbing clamp (c), backed on underside by a cast-iron fixing clamp (d), with adjusting washer nuts, fore and aft. The main clamping is done by the 7/16 in. Whit. steel wing set-screw. The hand-rest sole (see Fig. 3) is vee-grooved to fit, so that, with adjusting nuts set slack, the sole can slide on and across, with wing-screw set slack. On tightening wing-screw, the saddle, which previously can slide along bed, is clamped firmly to its position and the hand-rest socket held firmly down to position set by the steel double vee strip. Otherwise the hand-rest is adjustable for height and angularly in its socket. A most firm and effective mounting. The only addition made for this is that new 5/16 in. stud bolts and nuts were fitted. The same idea and saddle were used to mount the slide-rest (see Fig. 5), and, to add to the available seating, two strips of ⅝ in. sq. bright mild steel bar were added as brackets to each side of saddle, by sets of ¼ in. Whit. counter-sunk screws, three per side (see also Fig 3 and (e e) in Fig. 4). After these were fitted, the whole top, minus the vee strip, was planed flat and parallel to the bed apex. Ultimately the tail strip must be notched to run over bed apex at tail of lathe, but it will not be necessary to notch the head strip. Fig. 5 shows how the cross slide base of slide rest was treated on underside. The slide rest was by the Old Britannia Co., and was only planed on base to slide along bed and on edges of tongue, which fits shears of its original lathe with a pinned packing strip. As seen, the overhanging base was planed parallel all ways to the bed slide. The tongue was reduced and denuded of its shear packing strip, and further, the tongue was cross slotted double vee (like hand-rest socket) down to the new planed face, which is about 1/16 in. below the bed slide. Then two steel single vee strips were added and counter-sunk set-screwed to the planed plate, in such position, parallel with cross way above, to complete the double vee slot. This slides on and is clamped firmly in all respects as the hand-rest. The only variation needed to the doings of the rest was to reduce the flange swivel on top slide about 1/64 in., and to take a similar skim, in both cases by facing in the lathe, off the tool plate, so to reduce the under centre height of latter to allow of using 5/16 in. tool shanks as well as ¼ in. packed. The rest is fitted with a full spring controlled " Willis " tool clamp, and functions admirably in all its actions.

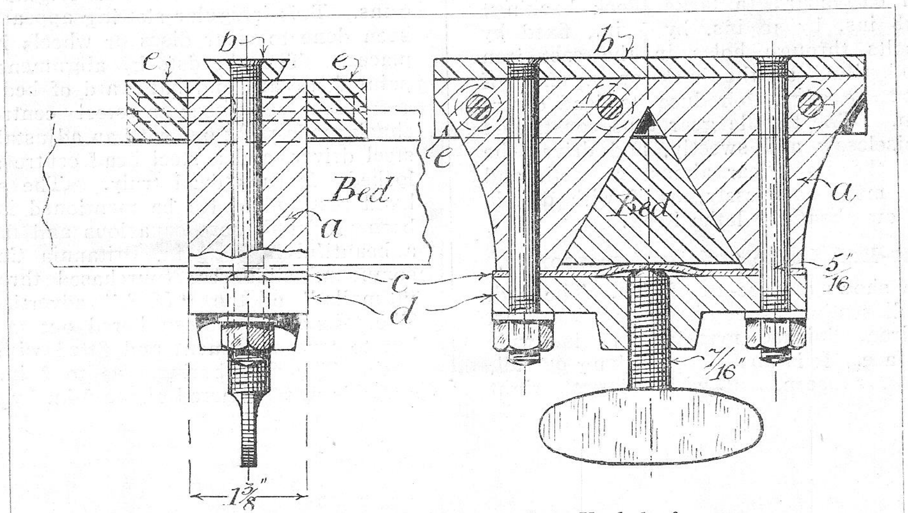


Fig. 4. Details of hand rest mounting. Used also for slide-rest (approx. ½ full size sections).

Fig. 6 serves to show the final additions to the tailstock. As is usual with these lathes (as invented by Maudslay), separate centre spindles or runners, are used for the various attachments, which are flatted on top, and secured by a flat guide key at top held down by a wing set-screw. They are pushed only by a hand-wheel screw in an outstanding nut on a tail bracket. This nut has been strengthened by the addition of a stepped bored steel collar shrunk on the stepped turned tail nose. The screw had a permanent tommy bar (like a vice), but we have added a handwheel turned and bored to fit, from an old valve control wheel. The centres supplied are seen to be a male and female coned hardened bar, used end for end, of 7/16 silver steel. An effective drill chuck was fitted, by attaching its turned stalk into a concentric hole of a mild steel 7/16 in. flatted bar by sweating. A simiar bar is seen to the left, turned to a tenon, and carrying, capable of swivelling, a hollow steel drilling pad, which was the only tailstock accessory supplied with the lathe as purchased.

This little machine is a most fascinating tool to use, and it was an equally fascinating job to put it good in the manner the writer has really only briefly described. Many of the extra accessories, as tools, spanners, keys, etc., were, fortunately for the owner, added from the stock thrown out from the old workshop due to the contraction on removal, and which would have, perforce, gone to the old metal man, and it is proposed to ultimately mount the 5½ in. faceplate seen at the head end of table in Fig. 1, but this is for future consideration. Thus far we were only able to complete, and get the lathe away, to start packing, but it is quite useable.

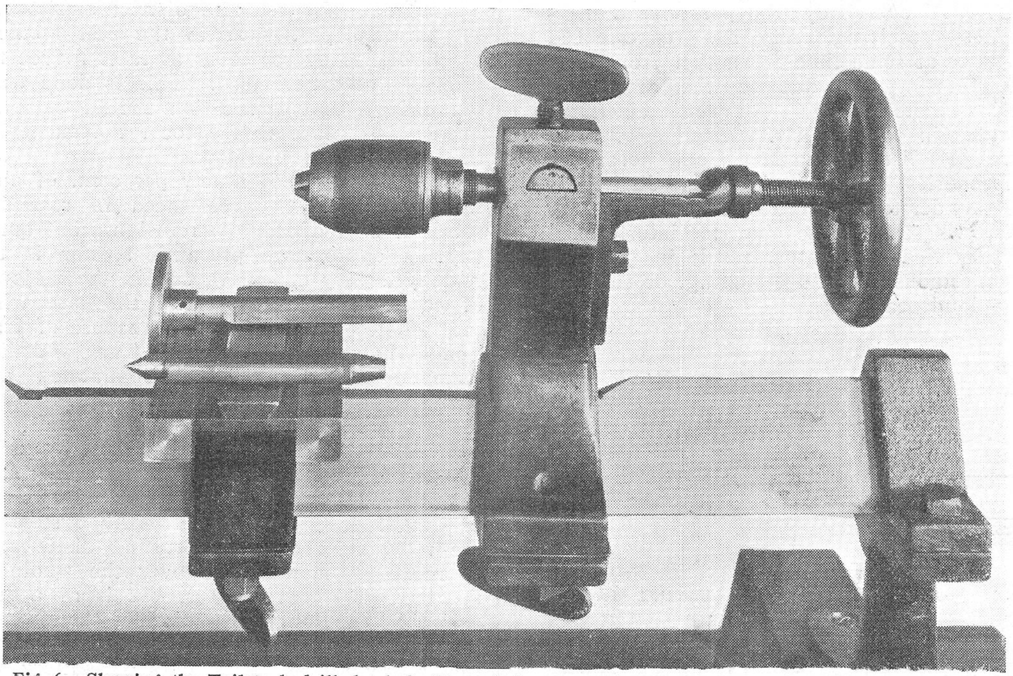


Fig. 6. Showing the Tailstock drill chuck double-ended centre and original swivelling drilling pad mounted on a new runner.

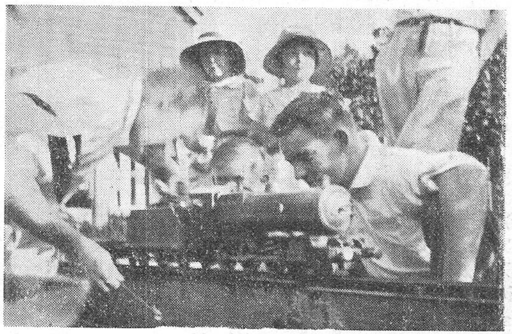
Queensland Society of Model and Experimental Engineers.

A very enjoyable locomotive outing was held at the residence of Mr. H. Eustace recently at New Farm.

Four locomotives took the track, but unfortunately early in the afternoon the valve gear of Mr. Eustace's locomotive gave trouble and the engine had to be placed out of commission.

Mr. Shannon's No. 1 gauge express loco. did yeoman service as usual, running practically the whole afternoon.

Mr. Miller kindly came along and "shot" the proceedings with his movie camera. The film he was able to turn out was excellent. Mr. Miller screened it at the following general meeting of the society.



Stoking-up for a trip.

Wireless Disturbance from Electric Motors.

By A. H. AVERY, A.M.I.E.E

NEARLY everybody who possesses a wireless receiving set has experienced annoyance at some time or another from electrical interference, due to the action of electric motors and kindred electrical apparatus in the vicinity. Such effects are generally distinguishable from ordinary "atmospherics" due to lightning discharges from thunderstorms which result in crashing noises, whereas, those due to interference from electrical apparatus, result in more or less continuous crackling, buzzing, or clicking in the loudspeaker.

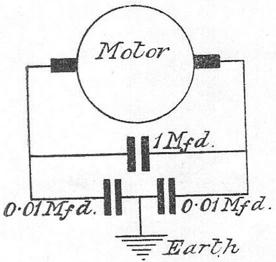


Fig. 1. For A.C. Motors or Motors with frames unearthed.

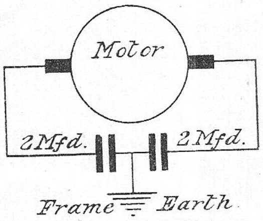


Fig. 2. For D.C. Motors.

The offending apparatus is by no means confined entirely to electric motors, although these perhaps interest the model engineer more than any others; the black list also contains such devices as neon signs, electric fans, refrigerators, vacuum cleaners, tramcars and trolley buses, even the humble electric bell or the electric ignition of small gas, oil and petrol engines. The villain of the piece so far as we are concerned at the moment is the motor used to drive the model engineering workshop, and the present notes are suggested by the difficulties of one particular reader who has sought our assistance, owing to complaints from the neighbours. The suggestions now put forward may probably provide a solution to others in the same predicament, who find themselves becoming unpopular with their neighbours from similar causes.

Until recently, the British Broadcasting Corporation was the chief source of assistance when such complaints arose, and anyone who cared to seek their help was provided with a questionnaire, which, after filling in, enabled advice to be given which usually effected a cure. But the increasing number of cases where help has been asked for has burdened their correspondence to such an extent that it has recently been found necessary to come to some arrangement with the Engineer-in-Chief of the Radio Section, General Post Office, 86, Wood Street, London, E.C.2, whereby, for the benefit of wireless licence holders an investigation of any serious cases of interference are carried out by a special staff, and who will, if necessary, send an engineer to visit the district and advise the affected parties as to the best methods to employ to overcome or at least reduce the interference experienced. This is done without charge, and application should be made in the first place to the local Postmaster of the district.

At least eighty to ninety per cent. of electrical disturbances experienced in receiving sets can be reduced to an insignificant quantity by appropriate precautions, nor is the remedy a very expensive one in the majority of cases. This is especially the case when interference can be traced to the use of fractional horsepower motors. The offending member is usually the commutator and brushes; the sparking which is so often present at the brushes, sets up a train of high-frequency oscillatory waves, which, although too feeble to be radiated very far in space, can be picked up by adjacent wiring and conducted to the aerial or earth system of the receiving set. The resulting disturbance to reception may extend over the whole of the broadcast wavelengths, but is as a rule worse on the longer waves than the shorter. It makes no difference in this regard whether the receiving set is a crystal, battery, or mains-operated set.

Motors of the "universal" type so largely used nowadays for domestic purposes, such as sewing machines and vacuum cleaners, are the worst offenders. They are necessarily designed with rather weak fields, and consequently have a high degree of armature reaction and special tendency to spark at the brushes. Fortunately they are confined to small sizes and are not extraordinarily difficult to deal with.

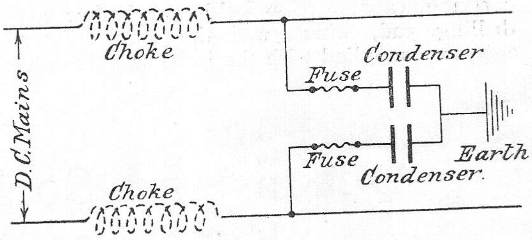


Fig. 3. D.C. Mains Suppressor.

In this connection the research department of Messrs. Belling and Lee, of Cambridge Arterial Road, Enfield, Middlesex, have done a great deal of original work to investigate and remedy these troubles. By their courtesy we are able to give the benefit of their experience to such readers as are troubled with electrical disturbances arising from workshop motors. The Disturbance Suppressor designed and manufactured by this firm embodies the recommendations of the Post Office engineering Department, and consists of a combination of condensers, or in some cases condensers and chokes combined and protected with fuses, suitably placed in the circuit.

On theoretical grounds, the correct place to apply the Disturbance Suppressor is at the source of the trouble, but when circumstances do not permit of this being done, the next best place is as near the electric supply meter as possible in the building where interference is being experienced, or at least between the meter and the main distribution fuseboard, before the disturbances get carried along the circuit wiring. The object is to bye-pass all such high frequency currents to earth before they reach the house wiring at all.

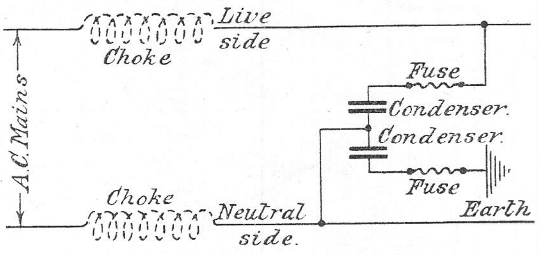


Fig. 4. A.C. Mains Suppressor.

Interference from fractional horsepower motors is usually amenable to suppression by the use of condensers alone, but in certain cases chokes will be required in addition. With motors of the portable type, and in all where the frame is not permanently earthed, Messrs. Belling and Lee recommend the use of a fixed condenser of 1 microfarad capacity to be connected direct across the brushes, together with two other condensers each of 0.01 mfd. capacity connected in series with one another with their common point earthed to the frame. Fig. 1 shows the circuit arrangements. With this latter precaution there is no possibility of receiving any appreciable shock from the frame at any time. If, however, the motor is already efficiently earthed, or if it is for use on direct current mains alone, the need for three condensers does not then exist. In such cases two condensers each of 2 mfd. capacity should be connected in series across the brushes, with their common point connected to the frame of the motor as well as to earth. This is shown in diagram by Fig. 2.

For safety reasons smaller condensers are used on alternating current mains, and chokes will then possibly be required also in the main leads to effect suppression satisfactorily. It should be particularly noted that in all cases whether on a.c. or on d.c. circuits, the leads to the condensers should be kept as short as practicable.

Two further diagrams are given, showing in Fig. 3 how to apply the Suppressor to the mains in the case of direct current circuits in the building where interference is being experienced, and the motor itself is not accessible. Fig. 4 is the circuit as applied to alternating current mains, where one side is "neutral" or earthed. The position of the chokes when required is indicated by dotted outlines.

Model Traction Engines and Boiler Fittings.

By HENRY GREENLY.

IN the finishing off processes necessary to model steam engines, whatever arrangement of fittings a designer shows on his drawings, nine times out of ten the actual maker of the model will from caprice, availability of a particular make of fitting, or superior knowledge and experience, elect to fit something else. Therefore I generally leave this matter to the builder. But queries arise such as that which has just been referred to me in connection with the "M.E." 1" scale traction engine, illustrated in these pages last year. With regard to the blower, the only thing I detailed was the fitting of a hollow stay bolt on the R.H. side of the boiler with the pipe and nipple connections to the concentric jet scheme in the smoke box. A reader now asks how is the blower to be fed. He says, "How is the blower pipe through the boiler to get its steam without a valve or something on the boiler, or does the pipe simply have a few small holes drilled in it?"

As a rule the blower in a traction engine is not worked from the cab as in a locomotive. Where this accessory is fitted, a small pipe is taken from the top of the boiler near the smoke box and, with a cock intervening, the live steam is led to a jet in the base of the chimney. The blower is only used in steam raising, although a blower is convenient if within reach of the driver, so that it can be turned on when the fire door is open, immediately the regulator is closed. This arrangement is essential in a railway locomotive to prevent personal damage. However, in my experience, it is usually the inferior driver (or fireman) who

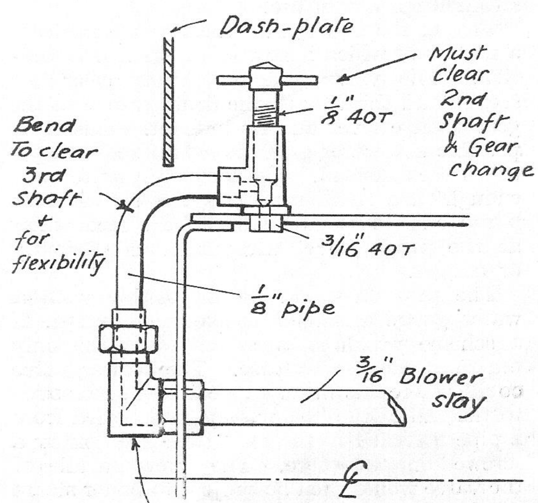


Fig. 1. An arrangement of blower valve for Traction Engine Models.

runs about with the blower hard on—the man who is always coming home with leaky tubes.

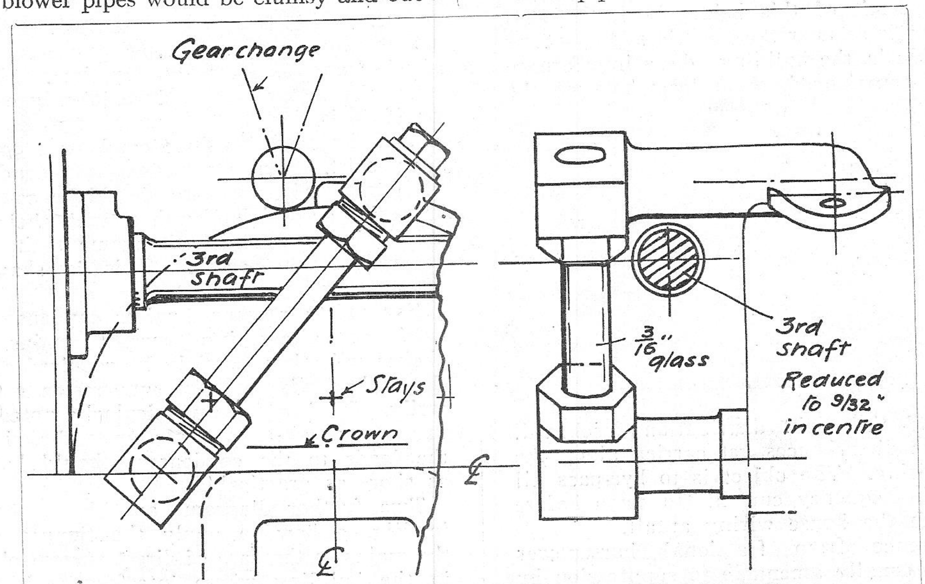


Fig. 2. Water gauge arrangement for "M.E." 1" scale Traction Engine.

For a small model traction engine such as that under consideration, it was thought that outside blower pipes would be clumsy and out of keeping with other "scale model" details, and therefore I illustrated an internal blower pipe common to model locomotive practice. At the cab end this hollow stay may be fed by a suitable pipe and cock, the attachment to the boiler being made by a pad piece somewhere under the second shaft. Obviously the blower stay is too near to water level to be used direct; the steam must come from near the top of the boiler.

The sketch Fig. 1 shows another scheme in which a screw down "no-gland" type of blower valve is used. With a long good fitting thread this valve is quite sound, as steam that can leak is at a reduced (wire-drawn) pressure. The blower valve is always shut against boiler steam when out of use.

Fitting the blower into the 1" scale model is a matter in which a host of things need attention. The valve and pipe must clear the second and third shaft, the dash plate, and the gear change lever and its bracket. This is all possible if a water gauge is eliminated and pet cocks used instead. The latter are quite good enough in a small model, as the shaft-driven pump can be set to maintain the feed water at the proper level without much difficulty or danger.

The position would be impossible with a water gauge arranged as sketched in Fig. 2, a scheme which it is submitted is the only practical one in this case. The blower valve could, where this water gauge is used, be moved to the end of the hollow stay, and be fed from a pipe attached to the top of the fire box by a screwed-on pad piece. The screw spindle of the valve would then be subject to boiler steam continuously and a packed gland an essential addition. The alternative would be to employ a union plug cock. These are standard fittings.

If a pressure gauge is desired, the attachment to the boiler involves another problem of space allocation. I would suggest that the top arm of the water gauge could have a connection for this pipe. There being no flow in a pressure gauge feed pipe, there can be no disturbance of water level. I recently had an S.M.E. colleague come to me with a locomotive in which the water gauge was fitted to a manifold, which, although open to the boiler, was subject to all kinds of fluctuations of pressure due to "flow." Hence the water level reading was made quite unreliable, and I would warn model makers on this score. To take the blower pipe from this hollow arm would be fatal to success.

Germany's First Railway Train to Run Again.

For the centenary celebrations of the German State Railways in September, 1935, the very first German train, the Nürnberg-Fürther Ludwigsbahn, is to run once more on its historic route. A replica of the original train is being built, and will be drawn by the unique ten horse power locomotive "Der Adler" (The Eagle) in its original size. The "Adler," which was bought for 24,000 marks (£1,200) from George Stephenson, was transported in an adventurous journey from England across Germany to Nürnberg and will be remodelled at the Pfalz shops, while the little railway carriages first to third class, of which the third class was open in those days, is being built by the Nürnberg works. It is proposed to take this train on the tramlines through the streets of Nürnberg and Fürth in the Jubilee Procession. In all probability the officials will don the old historic costumes, and if, as is expected, other costumes of the Biedermeier period are worn, a charming picture of the traffic of 100 years ago will be re-enacted. The train will also be exhibited at the Railway Jubilees in Berlin and Leipzig.

W.J.B.-L.

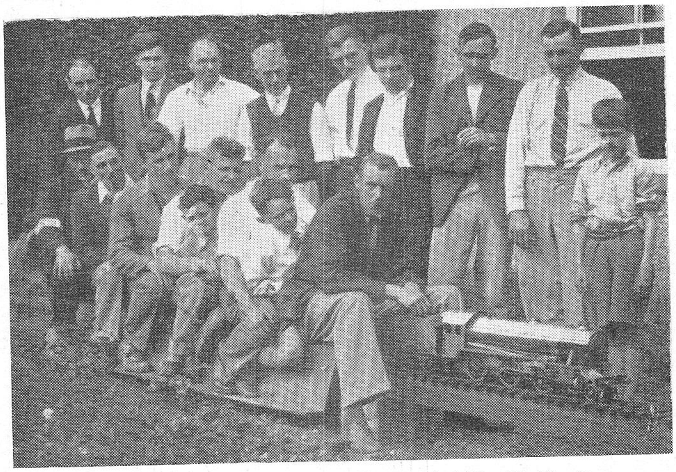
The Norwich Society Goes A-Visiting.

By GEORGE W. BARKER.

ALL the beauty of Norfolk concentrated in one spot! And a perfect day. This was the setting for the Norwich Society's visit to Mr. Gladden's home at Stalham, recently.

Beauty did not stop at the surroundings. Mr. Gladden's 3½ in. gauge "Mogul" can justly be described from all points of view as a lovely job; and the track, encircling the house, cuts through rural scenery which matches everything else at the home of this enthusiastic model engineer.

When one member turns up from Ely in Cambridgeshire and three from Lowestoft, you will know there is no lack of enthusiasm in the society. Perhaps it was a little overdone at the outset, however, when the burner of the false blast apparatus refused to do its job. A dozen or more people crowding into a small outhouse on a really hot day with the door and window shut to prevent a draught is a tall order; especially when each one knows the best way to do the job and starts to "help." Mr. Hill, perhaps by virtue of being Chairman, settled things by hitting the burner with a hammer; whereafter it went. The shock caused Mr. Gladden to drop the bottle of methylated spirit, which caught quicker than the burner. From this point things began to warm up in earnest and by the time we had steam up, we were all glad to get out into the sun to cool ourselves.



Norwich Society members loaded behind Mr. Gladden's 3½" gauge "Mogul."

The "Mogul" is now in action. Acceleration is extraordinary, and the speed at which we approach the first curve is most alarming. With a panic-stricken "Steady," greeted by a chuckle from the driver, we hang on with hands and knees. We are round; our hearts settle down; we tear up the straight and the scenery is lost upon us as we approach another curve and prepare to hang on again. Finding ourselves round this one and still not derailed our courage returns for the next and we begin to enjoy it. We dash out of a cutting and take the "Station" at full speed; round again with complete confidence this time.

The locomotive had more drivers in an hour or two than she had ever had before. Chasing ducks is outside a loco's usual duties, but when the writer took her round, we discovered two fine Aylesbury specimens in the cutting right in the way of the car running boards. They could have got out to the side easily enough, of course, but ducks do not always do sensible things. The regulator had to come into operation for the rest of the journey. We must have looked funny emerging from the other side, preceded by two white waddlers. We settled all our doubts about the functioning of the lubricator by wiping our faces after the run; oil is cheaper than new cylinders.

Mrs. Gladden is the ideal Mrs. Model Engineer. She had provided tea on the lawn in the shade of the trees and took it for granted that everyone would have to be forcibly dragged from the track to enjoy it. The discussions during tea! Those drawings that were all wrong! The hundreds of right ways of doing things; and the thousands of wrong ones which always came our way! Did "L.B.S.C." *always* have something else up his sleeve to tell you twelve months after you had built the engine? Why wasn't he here, anyway, to put our minds at rest? And so it went on, until the locomotive's whistle caused a rush for the track again.

Adhesion had been a hot subject of debate and by a strange coincidence the driving wheels just flew round when Mr. Hill (of hammer fame) endeavoured to take away a big load. Wiping the rails did not cure the trouble; cursing was no more effective; nor was taking off half the load; but getting the driver up off the brake handle solved the problem—it is the little things that count—and the engine simply walked away with half a ton up.

Part of the half ton was the President, Mr. H. O. Clark, known to readers by his contributions to this journal. He took things so easily that he forgot to "duck" at the first bend, and the branches took a fancy to his hat and pipe. However, all's well that ends well, and the evening was well worn before we let the steam down and retired to the workshop.

Here was something to ponder over. A fine edition of "Mary Ann" in 3½ in. gauge coming along. A four inch round bed "Drummond" lathe with treadle only, on which Mr. Gladden had built the "Mogul" and everything else. Yet he could have power without much trouble! Of such stuff are heroes made.

Time sheets are interesting things, although most of us dare not keep them. Coupling rods, I noticed, took four hours; which is not bad. No doubt the thirteen hours under the heading "Trouble with coupling rods" is easily forgotten when the loco. is complete. What a shock we should all get if we were so particular about records, to find most of the time down to the silly little things we expected to be cleared up in a few minutes.

What problems would have been solved had we no journeys to make and no homes to go to will never be known. The five separate and simultaneous arguments going on had to be inconclusively concluded as each participant realized he was late already. Our host and hostess had not finished for the day, either. You cannot shut a farm down at 12.30 on Saturday and open it up again on Monday morning. We said farewell to Mrs. Gladden as she was preparing supper for the ducks and gave a model engineer's "cheerio" to Mr. Gladden. Regretfully we left the scene where for a few hours we had been able to forget politics, economics, and all the crazy botherings with which man plagues himself almost from cradle to grave, and enjoy fully our respite from the business of "living."

A Design for a Small Self-contained Table Engine.

By H. MUNCASTER.

THE early engine makers were always striving to avoid the horizontal cylinder with its many defects, realising the waste of power and the wear consequent on dragging a heavy piston to and fro. For this reason many types of engine came into being, that were more complex and costly than the usual horizontal engine of the same power. The beam engine was a natural outcome of the mine pump, part machinery, part masonry. To make it available for small powers it had to be self-contained and completed at the works. To this end the table engine, amongst others, was designed, and as a rule was quite satisfactory in every way. Its advent coincided with the demand for a higher boiler pressure, so that it was generally used as a non-condensing engine.

There were no mass production methods to be observed, no jigs to be considered, and except for the patterns, it is quite safe to say that the cost of several engines was practically the cost of one multiplied by the number, and the liberty of the designers in that respect resulted often in considerable difference in examples by the same firm.

The example illustrated may be said to be a sample of the best design about a century and a quarter ago. It has been reduced to the size of a model small enough not to be cumbersome and yet large enough to be constructed by the average amateur. Its compactness may be noticed, the base being about 3½ inches square compared to a horizontal engine sprawling over about 14 inches.

True, there is an extra crank and connecting-rod, but the engine is entirely self-contained and does not require the "outer bearing" so often applied to the horizontal engine. Again the valve gearing is so conveniently arranged for adjustment, oiling or overhauling that it could not easily be improved.

To save unnecessary length in the connecting-rods, the cylinder is sunk below the surface of the table, as shown in the section (Fig. 2), coming at the lower end between the cranks. This amount is limited by the requirements of the valve chest.

With regard to the ports, the sizes given are to some degree proportionate to the original, but for the purpose of a model, will do, if only of a size sufficient to turn the shaft at a very moderate rate, the slower the better. Probably a hole of ⅛ in. in diameter will be quite sufficient.

The bed frame is easily constructed and the patterns quite easily made. The material for the pattern should not be more than ⅛ in. in thickness, probably the resultant casting will be 5/32 in. as dimensioned. The alternative method of jointing will be most suitable for small work, although in a large engine the original is preferable. The point is that in a large casting you can take a chisel and trim the joint on the inner edge, which would be difficult in a small casting. The bolt holes are shown square, which would be quite suitable if cast in, but in this case is merely an excuse to save the trouble of drawing small circles in isometric projection.

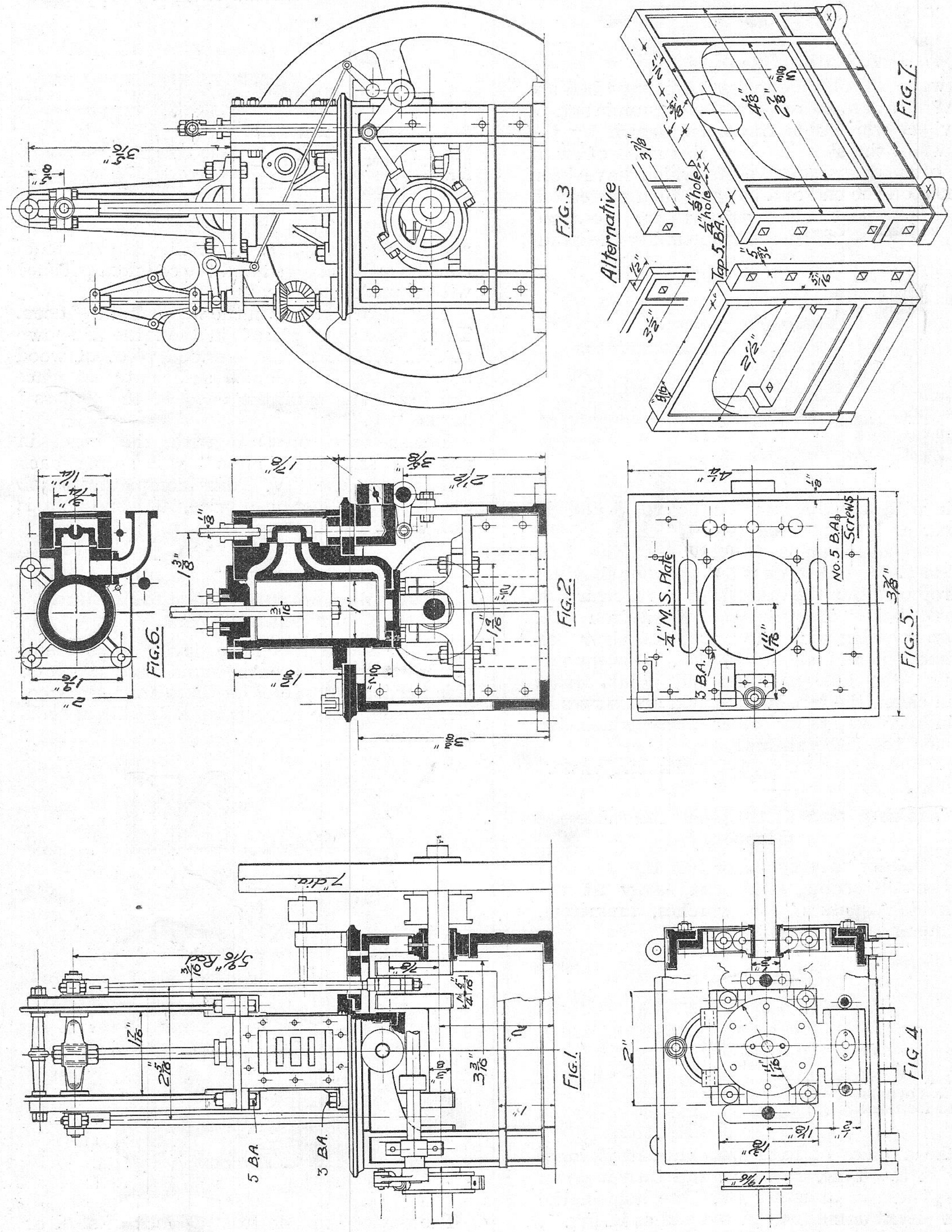
The bolts holding the shaft bearings are in an awkward position for drilling, and can only be approached from below, drilling through the bottom flange of the bed. The best way to get over the difficulty seems to be by means of bosses cast in the frame, as shown in Fig. 2, by the dotted lines. The valve shown is intended to have a lap of 1/16 in. and a stroke of ⅜ in. The eccentric could then be set to give a visible opening when the engine is on dead centre. Then there is a leverage of ⅞ in. to ⅝ in. in favour of the eccentric, so that the travel of the latter is .52 in. The valve gear side-rods are threaded through the holes shown in the top plate of the table (these may require to be elongated).

The valve spindle crosshead is not shown, but may be made to harmonise with the main crosshead shown in Fig 1.

The governor and gear may be left until the last; there is no difficulty about the construction, except that, being small, it requires some expert handling. The balls as shown are $\frac{5}{8}$ in. diameter and the rods $1\frac{1}{2}$ ins. measured from C. of ball to C. of pin. The throttle valve must be entirely frictionless, as the governor has so little power. It is assumed that the method of making this steam tight without packing is known so universally that it is not shown here.

In the original engine the feed pump was worked by a lever keyed to the rock shaft operating the slide valve allowing the same length of stroke as the valve ($\frac{3}{8}$ in.). The type of valve shown in detail—Fig. 15, page 466, May 17th—is recommended, reducing the ram to $\frac{1}{4}$ in. diameter. A better way might be to make the eccentric lever into a bell crank and work the pump without having to put the strain into the rock shaft.

Notice that the screws are dimensioned for B.A. threads, the reason is that the Whitworth thread is too coarse for model work in the opinion of the writer.



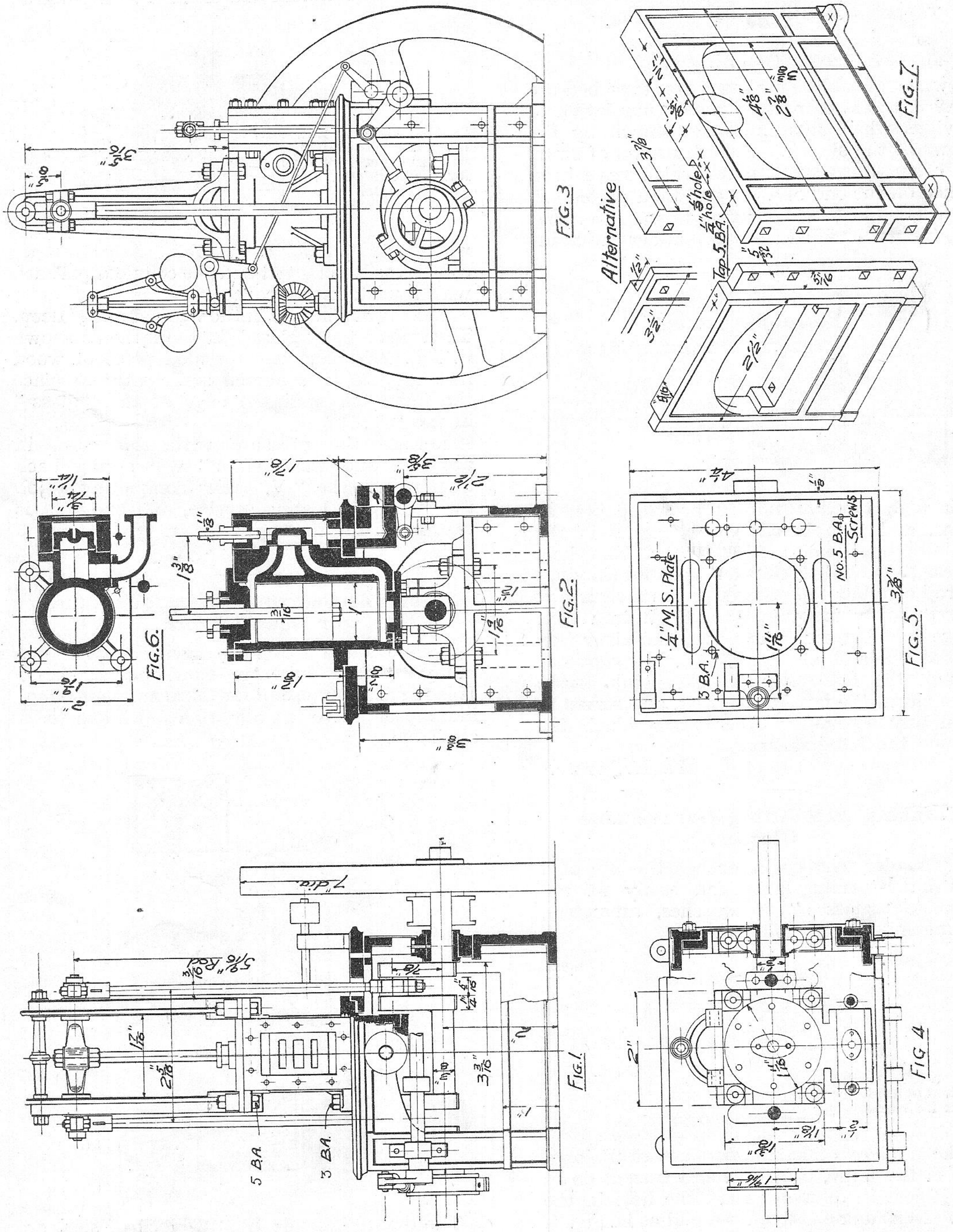
Elevations, plans, sectional and isometric sketches for a small self-contained table engine.

The valve spindle crosshead is not shown, but may be made to harmonise with the main crosshead shown in Fig 1.

The governor and gear may be left until the last; there is no difficulty about the construction, except that, being small, it requires some expert handling. The balls as shown are ⅝ in. diameter and the rods 1½ ins. measured from C. of ball to C. of pin. The throttle valve must be entirely frictionless, as the governor has so little power. It is assumed that the method of making this steam tight without packing is known so universally that it is not shown here.

In the original engine the feed pump was worked by a lever keyed to the rock shaft operating the slide valve allowing the same length of stroke as the valve (⅜ in.). The type of valve shown in detail—Fig. 15, page 466, May 17th—is recommended, reducing the ram to ¼ in. diameter. A better way might be to make the eccentric lever into a bell crank and work the pump without having to put the strain into the rock shaft.

Notice that the screws are dimensioned for B.A. threads, the reason is that the Whitworth thread is too coarse for model work in the opinion of the writer.



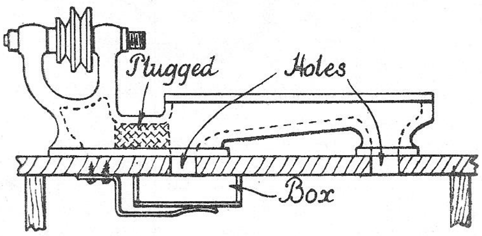
Elevations, plans, sectional and isometric sketches for a small self-contained table engine.

Workshop Hints and Gadgets.

Short original and practical contributions to this page are invited from readers, and will be paid for. Write on one side of the paper only; address items to the Editor of THE MODEL ENGINEER, *and mark envelopes "Workshop Hints."*

A Lathe Cleaning Tip.

Owners of a lathe having a box type bed are often at a loss to remove the accumulation of shavings which fills the space shown by the arrows in the sketch. Into this mass of swarf one often drops small parts which have been formed on the end of a bar and then parted off, and time is lost in recovering them. To avoid this, the writer filled the space under the headstock with tightly rammed brown paper, as shown, and then bored two $1\frac{1}{2}''$ holes in the wooden bench below the lathe. The hole nearest to the tail-stock is left open for shavings to drop out, but the other hole has a cigar box secured below it by means of an iron clip. Before tackling any fine work, the cigar box is removed, and all swarf, etc., is swept out through the hole with an old paint brush. When clean, the box is put back, and serves to retain any screws or other parts which fall between the lathe shears.



H. H. WARD.

Making and Fitting Unbreakable "Glasses."

Any reader who owns, or has the use of a small hand-turning lathe can easily fit unbreakable "glasses" to watches, ammeters, volt meters, etc., as follows :—

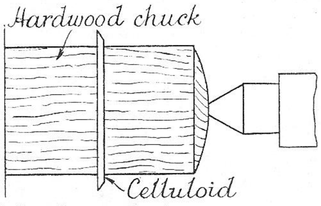


Fig. 1. Showing method of holding glass for turning.

Take a piece of hard wood about 2" long, fix it in the lathe, centre it, and turn it down to a $\frac{1}{4}''$ less in diameter than the hole in the bezel. Next dome the centred end as in Fig. 1, cut the wood in half, and face the cut ends.

A piece of fairly stout, clear celluloid should now be cut out a little larger than required, and fastened with a few spots of Burgundy pitch to the piece of wood in the lathe, while the other piece is forced against the celluloid by the back centre as shown in Fig. 1.

The celluloid should now be turned down to .04" larger than the "V" cut in the bezel, and the edge turned to an angle of approximately 45 degrees. When this has been done, remove the celluloid and clean it with paraffin, which quickly removes the pitch. Any scratches can be easily removed and the celluloid polished with a paste metal polish.

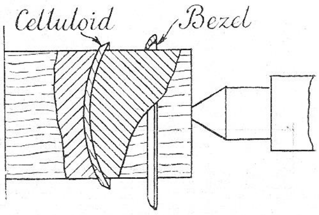


Fig. 2. Showing how the glass is domed, and the bezel ready for slipping over the glass.

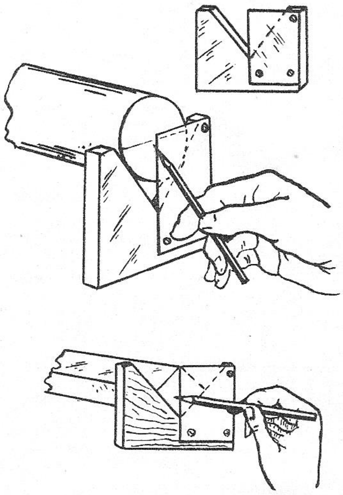
Next turn a hollow in the wood about $\frac{1}{8}''$ deep. Then place the "glass" in the lathe as shown in Fig. 2, forcing the rounded piece of wood into it until it is domed sufficiently to place the bezel on, with the edge of the "glass" in the "V."

Release the pressure with the bezel in position, and the "glass" will spring back tightly into the "V," thus completing a job that will give lasting service, and one that is well worth the time spent on it.

A. J. WEBBER.

A simple Centring device for Round or Square Work.

I have found this little device most useful in my workshop to centre round or square bars. It is particularly useful for those amateurs who, like myself, have not always a full kit of tools available.



The device is made from a block of steel or hard wood, $\frac{3}{8}''$ or $\frac{1}{2}''$ thick, with one "V" cut as illustrated. On the face of the steel or wood block, a thin plate is fitted, which must be perfectly square, and bisecting the "V" as shown in the illustration, which describes the little tool in use.

H. BARKER-BLAND.

MODEL MARINE NOTES

Model Power Boating Experiences in South Africa.

By A. C. JOLLY.

Of course, the " M.E." began it all. About four years ago, when matrimony put a sudden stop to my activities as a motorcyclist, I was left without a hobby, and it was while scrounging around for something to do that I happened on a copy of the " M.E." and read in it a description of a 30 c.c. petrol engined hydroplane. The idea fascinated me, and forthwith an order for the " M.E." was placed with the local newsagent. After reading all I could on the subject for six months or so, the time seemed ripe to try my own hand at the game, so an order was sent to Stuart Turner for a set of castings for their Lightweight two-stroke engine. In due course they arrived and in fear and trembling the machining was commenced. As this was the first serious attempt at model making I had ever undertaken, I was somewhat nervous as to the results, but in the end the job was successful, more by good luck than good management, I am afraid ! The machining of the crankshaft from the solid will never be forgotten, it seemed to take months. Parting tools broke, throw pieces shifted, and various other horrid things happened. One Sunday morning the peace of the neighbourhood was rudely disturbed by a tremendous hoot of joy from the workshop—the crankshaft was completed and what was more important, true. What joy, what bliss !

Slowly the rest of the engine was finished, and then, more hastily, the hull. Over the lines of that boat I would fain draw a veil. She looked more coal-scuttle-ish than any coal-scuttle ever made, and she weighed about a ton. Her only redeeming feature was that she actually went—at about ten miles an hour. All the same she gave a lot of fun and the experience gained was invaluable.

Before building a new hull, it was decided to try and coax a few more scale horses out of the engine. Thereupon a period of unrest was entered into, in which small files and dentists' burrs played a prominent part, while the ports were altered and polished. Gradually the revs. mounted, so much so in fact that petroil lubrication proved inadequate for the big end. I don't know how many oil pumps were made before the job was given up in disgust and the whole lot of them parked in the scrap box. They all suffered from the same complaint : they would not deliver oil in small quantities. Finally, the pressure-vacuum system was adopted, similar to that used on Villiers' motor cycle engines. This has proved itself utterly reliable, has no valves to go wrong and will deliver anything from a drop a minute to a stream sufficient to lubricate the most intemperate of engines. I can thoroughly recommend this system to anyone who wants reliable lubrication for two-strokes.

The next thing that came under suspicion was the carburettor. In the original the mixture went through a right-angle bend before entering the cylinder. This seemed all wrong, so a new carburettor was built up from brass rod with a straight through induction pipe and fitted with a butterfly valve. There is nothing startling about the design of the instrument, which follows usual practice in having a submerged jet and an air leak. The drip feed is mounted on the induction pipe for accessibility, the oil being led thence via the rear main bearing to the big end.

A free wheel starting pulley was next fitted. This takes the form of an aluminium pulley free to rotate on the flywheel boss. Two holes are drilled in the face of the pulley which abuts against the face of the flywheel, and in these holes are spring-loaded plungers which engage in similar holes in the flywheel face. One side of these latter holes is bevelled off so that the plungers can disengage when rotated in one direction but not in the other. This device has proved quite satisfactory in operation and is very easy to make. This completed operations on the engine for the time being. Various fuels were tried, pure benzole proving the best. As, however, it costs about 16/- a gallon in this country, it is only used when the last ounce of power is required.

There would appear to be a Jonah or other baleful influence roosting in my workshop, at least as far as fan brakes and dynamometers are concerned. On one occasion a fan brake came unstuck and disappeared through the window. The window was closed. Need more be said ? On another, when an oil cooled dynamometer was being used and the engine was doing a merry 6,000 r.p.m. something fearful happened and I was soused in more or less boiling oil. I am seriously considering buying a suit of armour and a crash hat !

After all this excitement, the building of a new hull called " Erebus II " was commenced. It was a metre long, 10¼ ins. in beam, with a ¾ in. step placed 19 ins. from the transome, and weighed complete with engine, etc., 11 lbs. 10 ozs. When finished it looked, to me at least, quite a posh affair. My pride, however, was rudely shaken when a dear old gentleman, seeing it unpainted and with the deck on, and of course, without the engine, etc., asked if it was a new kind of musical instrument ! On explaining that it was a model hydroplane he remarked " I didn't know you were interested in flying." After that we talked of the weather ! This hull achieved a speed of 25.54 m.p.h. over five laps, but the engine never ran well owing to the moisture in the coil, which was made up out of a coil taken from an inductor magneto. Since then a Stuart Turner coil has been in use, and in spite of several immersions has never failed to deliver the goods.

"Erebus III," the next hull to be constructed, was similar in dimensions to "Erebus II," but with a step 1⅛ ins. deep. I believe that if this hull could have been persuaded to stay on top of the water instead of playing at submarines, it would have been quite fast. As, however, it never completed a lap without nose-diving with great ferocity, it was given up as a bad job. At the moment, work on hulls has ceased pending the completion of a four-stroke engine.

Perhaps readers may be interested in the conditions for power boating in this country as I have found them. Suitable water is very scarce. One either finds a small pool consisting more of mud and weeds than water, or a small lake about fifty feet deep and simply miles across. The idea of erecting a pole in such an ocean is enough to daunt the most rabid enthusiast! Consequently, as far as I am concerned, the running of my boats takes place only once a year when the annual holiday falls due and I can get to a place where there is a salt-water lagoon. Even so, troubles beset one, as it is in a very exposed position, and owing to the high winds that prevail, one gets only half-a-dozen days in the month which are sufficiently calm for the purpose. How one envies the concrete ponds one reads of in the "M.E."! As to model supplies, they simply do not exist. Everything has to be made on the premises or imported. In conclusion, I would like to mention that, with the exception of my own boats, I have never seen a model hydroplane "in the flesh," and know of no one who is particularly interested in them. Still, it is a great life, and if these notes help some lonely enthusiast to keep his pecker up I will feel amply repaid.

Model Aeronautics.

Society of Model Aeronautical Engineers.

The Australian Models.

The models sent by the Model Aeroplane Association, of Australia, which did not arrive in time to take part in the Wakefield Cup Competition, were flown at Fairey's Aerodrome, Hayes, Middlesex, on 15th July. They were flown according to the Rules of the above competition, namely, that three flights R.O.G. were allowed and the average of the three taken as the points scored. The full results are given below and it is of interest to compare these with the figures given on page 44 of the 12th July issue of the *Model Engineer*. A. Robson's flight of 82.8 secs. was the best of the day, but J. Fullarton had the best average with 58.8 secs. duration. The S.M.A.E. has decided to award one of the Society's Silver Medals to the last-named entrant as an appreciation of Australia's effort.

Auto-gyro Record.

On the same day Mr. Crow, of the Blackheath Model Flying Club, succeeded in making a flight with a fuselage type auto-gyro model. No supporting plane beneath the rotors was employed. Whilst the flight (14.4 secs.) was not of great duration, it was sufficient to show that the machine was definitely flying as an auto-gyro, and it has, therefore, been recognised as an official record for its type. Mr. Crow is to be congratulated on tackling and succeeding in this difficult problem.

A Wakefield Fund.

In order to meet expenses incurred in the running of this year's Wakefield International Competition, the S.M.A.E. has inaugurated a Wakefield Fund and would be pleased to receive donations (large or small) from any who can and would like to assist the Society in this connection. Donations should be sent to the Treasurer, Mr. W. E. Evans, 20, Thurlby Road, Wembley.

	Number of Model	Names of Individual Members of Team	Names of English Proxy Flyers	Flights.			Average Duration of 3 flights	Position.
				1st	2nd	3rd		
AUSTRALIA	1	E. E. LUKE	H. A. Bryant ..	23.7	Wing crashed.		7.9	6th
	2	A. ROBSON	C. L. Faudell ..	28.4	57.0	82.8	56.1	2nd
	3	M. DAVIS	M. G. Lucani and D. Fairlie ..	21.2	58.4	42.2	40.6	3rd
	4	H. J. MACKAY ..	J. W. Knott ..	13.8	28.5	7.5	16.6	5th
	5	N. NEEDHAM	H. York	13.3	27.2	10.1	16.9	4th
	6	J. FULLARTON ..	L. M. Walker ..	56.0	64.3	56.2	58.8	1st

QUERIES and REPLIES

Querists must comply with the Conditions and Rules given with the Query Coupon in the Advertisement Page of each issue.

6,138. — Lathe Lubrication. — J E.M. (Cheltenham).

Q.—I am building a lathe, the bed of which is made of railway lines. Could you please inform me if I should use grease cups, oil drip lubricators or oil cups for lubricating the following points, headstock bearings, feedscrew bearings, treadle shaft bearings? I have also a three-speed wheel for the treadle, this measures approximately 30¾ ins., 28¾ ins. and 26¾ ins.; what size pulley would you recommend for the headstock?

A.—You will need neither grease cup nor oil drip lubricator on a lathe. You can use shallow oil cups, but not with the idea of filling them, but so that they can be capped, screw, push-fit or hinged, to exclude dirt. If the lathe bearings are properly fitted, it will hold its oil in the form of a bush, and if high-speed is employed, use thin machine oil. Feed screw and treadle shaft lubrication is usually only through oil holes which are generally better fitted with fairly tight plugs to exclude dust and dirt.

You do not say whether lathe is for wood or metal turning, or both, and also whether it is plain or double geared, or what are the centres. Your flywheel is rather larger than is usual and has not a slow speed rim. We can only give you therefore a mere suggestion. Say the mid gear is 6 to 1 up and treadling 60 to 80 per minute gives 360 to 480, that means a 4¾ in. mid size pulley on cone. Then stepping up 1 in. in radius to match wheel, gives large size cone 6¾ ins. and small size cone 2¾ ins. The relative speeds will be: slow 280 and fast about 800. This will give a fair average for wood and metal, but is not really fast enough for soft wood turning small diameters.

You will need three sizes of belt, because, with a wheel stepping up and down 1 in. in radius, it will require about 1⅝ ins. steps on cone radius to keep same belt, which requires a variation in diameter of 3¼ ins. up and down, a rather too disproportionate arrangement.

6,216. — Three-inch Scale Traction Engine.—F.M. (Chesterfield).

Q.—I should like to build a 3 in. scale model two-crank compound traction engine of the "Fowler" type, as built for showmen. Where could I obtain drawings for this type of engine?

A.—Mr. John Sayers, of Harboro Road, Rushden, Northants, is building Mr. H. Greenly's 1907 model 3 in. scale "Fowler" traction engine and we understand that it will be ready this summer (possibly for the "M.E." Exhibition). He may be able to help you in the matter of castings. No drawings other than those published are available.

6,149.—Casting Model Railway Components.—J.L.A. (East Ham).

Q.—Could you please advise me what metal is most generally used to cast "0" gauge axleguards, and wheels, is it white metal, if so, where can I obtain same? What is the best material to use for casting above? Would plaster of Paris be suitable?

A.—Axleguards and wheels in "0" gauge are usually die cast in a special zinc lead alloy, of which no details are available, and probably different in various makes. You would probably succeed in casting such in lead antimony, fairly high in the latter, but the proportions would perhaps be best decided by experiment. Plaster of Paris would make suitable moulds, and there is a kind of mock pressure casting done, in which, after pouring the flat baked casting in an open mould lying horizontally, a sheet of damp asbestos is laid over and pressed down with a hot iron; the steam generated by the action of the iron and contact with the hot metal causes sufficient pressure on the molten metal to drive it home into the mould.

6,180.—Railway and Engineering Drawings.—K.R.McL. (Hove).

Q.—Can I obtain drawings from the Southern Railway and other engineering concerns giving full dimensions and methods of construction of their products, for the purpose of reproducing scale models of same? If so, then to which department should I address my communications?

A.—Supply of drawings and information about their products is entirely a matter of courtesy on the part of locomotive works and other engineering concerns. A *polite letter* stating the writer's desires and the purpose for which the drawings and information are required will often meet with compliance when the object is not one against the interests of the concern. Firms, and the chief mechanical engineers of railways have shown an interest in model makers and willingness to meet their requests for information. Quite likely no charge would be made. In the case of a railway, it would be correct to apply to the chief mechanical engineer at the railway works, say Swindon for the G.W.R., Ashford or Eastleigh for the Southern, Derby for the L.M.S. and Doncaster for the L.N.E.R. With firms, you would simply address the firm by its name; if you do not obtain a reply, write again, also *politely*, your letter may not have been seen by a responsible person. Much information about locomotives can be obtained from the Locomotive Publishing Company, 3, Amen Corner, Paternoster Row, London, E.C. Refer also to weekly engineering journals, which you can perhaps consult at a library.

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6,173.—Electric Blower for Small Organ. E.G.W. (Bristol).

Q.—I have a small organ 4 ft. long × 2 ft. deep back to front and 3 ft. 3 in. high, with 61 notes and 16 stops. There are two knee swells but no couplers. I find this very heavy to work, and should be glad of particulars as to an electric blower, if possible with an automatic control.

A.—From the dimensions given of this instrument, it seems evident that it is a reed organ and not a pipe organ, and as (with one exception) these instruments work on the suction principle, you would require a special suction type "blower" for the work. To drive this, a motor of one-quarter horsepower is sufficient, but it needs to be specially designed for silent running, and we should advise you to get into touch with Messrs. Watkins and Watson, Ltd., of White Lion Street, London, N.1, who will supply you with particulars of their "Discus" blower, which can be arranged either for suction or pressure. The blower is totally enclosed in a sound-proof wooden case with a trunk connection from the organ base to the blower at the back of the instrument, arranged in the most convenient position for access. These blowers usually work on about 3½ inches water gauge, and a control valve is incorporated which is operated by the reservoir bellows. This is not always essential, but helps to maintain a better tone on the full organ.

5,140.—Hot Air Engines.—W.R. (Melbourne, Australia).

Q.—Can you give me the sizes of power and displacer pistons and cylinders for hot air engines of 1/10, 1/8 and 1/6 h.p. (approx.) respectively? The type I am trying to constuct is, I believe, of German design; the one I have seen was arranged vertically, the power cylinder placed on top of displacer cylinder and the crank shaft arranged above that again, the power piston has a double con-rod, and the displacer piston rod was worked between this, and through the centre of the power piston. Could you describe what is termed a regenerator? I understand it is arranged between the two cylinders to absorb the heat on one stroke and give it up on the return, and what piston packings would you recommend?

A.—There is very little information available about hot air engines, and we presume that those actually in use and sold have had their proportions derived by experiment. A Robinson 2-man power engine = ¼ h.p. approximately, has a cylinder 8 inches diameter by 5 inches stroke, and runs at 270 revs. per minute. A 1/44 h.p. engine has a cylinder 4½ inches diameter and runs at 300 revs. per minute. Later figures from the maker's list give 7½ inches diameter cylinder and 150 to 190 revs. per minute for the ¼ h.p. engine, and 5½ inches bore and 150 to 210 revs. per minute for a 1/11 b.h.p. engine. These are the only data we can give you. An explanation of the principle of working and drawings for construction of a model hot air engine are given in our book "Simple Mechanical Working Models." Hot air engines give very small power in proportion to dimensions and run at low speeds. The makers we mention are Messrs. A. E. and H. Robinson and Co., Engineers, Church Street, Beswick, Manchester, England. Working parts must be very free or most of the power will be absorbed by friction, and the engine may not work at all. We doubt if piston packings are permissible on account of friction.

6,187.—Dynamo for Lantern Arc Lamp.—J.W.C. (Reading).

Q.—I wish to operate an arc lamp by driving a dynamo by a 1¼ h.p. petrol engine for a lantern projector. Is this practicable? If so, will you please give me the output of the dynamo?

A.—The voltage and current required for a lantern projector depends upon the size of picture to be shown and the distance between lantern and screen. Also as to whether the lantern is projecting through ordinary slides or cinema films. For amateur purposes a dynamo giving about 50 to 60 volts and about 10 to 12 amperes would probably suit your needs. The engine, if it really gives 1¼ h.p., would drive the dynamo to give this output; if drive is by belt, you would not obtain quite so much output as with direct coupling to the engine shaft. The field magnet should be compound wound. Information about projection is given in the "Practical Electrician's Pocket Book," price 2s. 9d., post free. It is advisable to have a small regulating resistance in the circuit to adjust voltage and steady the arc. About 4 ozs. of No. 16 gauge Eureka or similar resistance wire will serve the purpose.

6,128.—Gas Blowpipes.—J.H.E. (Market Drayton).

Q.—I am making a boiler to L.B.S.C.'s design for "Annie Boddie" for a 2½ in. gauge loco.; do you think that the self-blowing blowpipe sold by M. E. Boardman, of Sedley Place, W., would give enough heat to braze the joints? If not, would the introduction of a central jet for oxygen raise the temperature sufficiently?

A.—The large size advertised at 12s. 6d. might, we think, give enough heat for the purpose if you use a low fusibility spelter, which you could obtain from Messrs. E. Gray and Son, Ltd., 18, Clerkenwell Road, London, E.C. The part to be brazed should be packed around with asbestos blocks or fireclay so that the heat is confined; you should not expect to effect brazing by merely directing the flame upon the boiler. Quantity rather than intensity of heat is required, the boiler itself will conduct heat away during the operation, so you must have ample quantity to bring the joint up to brazing temperature. Something will depend upon the heating value of the gas supplied from the mains. If you introduce a jet of oxygen we think the result may be an intense local heat, which will melt the copper as in cutting and welding use. It is the spelter which is to be melted not the copper of the boiler. Practice on some pieces of copper first to get experience.

5,698.—Winding a 60 Volt Synchronous Motor.—C.B. (Wakefield).

Q.—I am interested in the motor described in your reply No. 5,580 to N.P. (Truro) on page 242, Sept. 7th, 1933, issue of the "M.E.," and as I am constructing a similar motor to work from a transformer stepping the mains voltage down to 60, I should be glad to know what field winding you would recommend for this voltage, also the approximate consumption of the motor in watts.

A.—For a 60 volt 50 cycle circuit you will require 300 turns of No. 28 S.W.G. enamel and s.s.c. copper on each pole. As regards the consumption in watts, this might amount to 30, so that on 60 volts the current input would be in the region of half an ampere. These figures are approximate only, the motor being experimental and no actual test figures are available.

6,232.—Steel Screws in Copper Boilers.—R.H.B. (Behar, India).

Q.—What is the reason for the objection to iron or steel parts being in contact with the water in a copper boiler?

A.—If you use small iron or steel screws in a copper boiler, electrolytic action will soon cause the steel or iron parts in contact with the copper and the water to corrode. On one occasion, brought to our notice, some steel hand-rail knobs had been tapped into the barrel of a copper locomotive boiler, they failed to hold after 10 months' service. The same makers also put in steel screws for securing pad pieces on the same boiler. These also quickly rusted away and had to be replaced by copper screws.

6,192.—Connecting Up Charging and Lighting Set.—W.J.G. (Ashford).

Q.—I enclose sketch (not reproduced) of my switchboard, and should be much obliged if you will fill in the necessary connections between the board, dynamo, and battery, also explain the purpose of the variable resistance.

A.—We are afraid space can hardly be spared to illustrate a complete switchboard diagram of this nature, but if you can refer to the handbook "Electric Lighting" (A. H. Avery) practically the same board as yours is illustrated in Fig. 53 on p. 125. The purpose of the variable resistance on the right of your switchboard is to control the dynamo output by increasing or decreasing the amount of resistance in the shunt field circuit, without having to vary the dynamo speed. The other resistance on the left of the board is for starting up the engine by "motoring" the dynamo, and is probably connected in circuit with a separate "series" winding on the dynamo fields, which is cut out so soon as the engine commences to fire. We suggest that you should send the sketch of your switchboard to the makers, Messrs. Arthur Lyon and Co., whose address is Africa House, Kingsway, London, W.C.2, since this is a standard production of theirs, and they will be in the position to supply you with a standard connection diagram for this particular lighting set.

PRACTICAL LETTERS *from* OUR READERS

Burners for Steam Cars.

DEAR SIR,—With reference to the article in the July 12th issue by Ralph Neville, the writer uses a Primus burner for cooking continually, with no trouble whatever, and wishes the Primus Company would produce a scientific burner for boilers. Such burners rely on the pressure difference in the container and the pressure of the paraffin vapour in the heater to produce a steady flow. They are very efficient, in fact the container often works a week without refilling, and the mixture appears to be scientifically proportioned. Two heaters are usual, one a coil or ring and the other a receiver next to the flame, to ensure proper vaporization. The "Aurora" burner would nearly do, but it is intended for a horizontal flame. A receiver somewhere near the furnace, like an air vessel on a pump, looks very likely to be a success with a pump feed. Of course, with such a huge affair as a boiler requires, a subsidiary heater is desirable, so that the boiler can always be nearly ready to steam when the main burner is turned off. A flame which is perfectly efficient, and under human control entirely, requires the application of genius, and such a burner would be a memorable achievement.

Yours faithfully,
E. D. RENDELL,
Rock Ferry, Cheshire.

Steam Car Matters.

DEAR SIR,—Reading THE MODEL ENGINEER of July 12th, 1934, I was very interested in Mr. Ralph Neville's experiences with the Stanley Steam Car. The trouble with the burner may be cured by fitting a burner from an old White Steam Car. These burners were very good, and simple, too; they worked with heavy petrol, but could be changed to work with paraffin; that is, to start on petrol and, when hot, change over to paraffin. These cars had a condenser (like a radiator) also; the engine pumped the water from the bottom of the radiator to the tank. This method had two advantages; the water for feeding the boiler was rather hot, and the boiler got less scale. With the Stanley you had to fill up with water very often, with the White very seldom. Stanleys never would fit a condenser, on account of the danger of getting oil in the boiler—so they let the steam escape freely, and you had always to fill with fresh water. With the White boiler, which had very hot small tubes with very little water, the oil did no harm at all; it evaporated with the water.

The radiator must have no overflow tube, but a relief valve to allow for the escape of excess steam. The engine worked with 700 to 1,000 lb. per sq. in. superheated steam. In the tank of the White car there was always a thick layer of oil, and if the tank is not allowed to get too low, most of the oil will stay in the tank, and can easily be removed afterwards. As there were a lot of White steamers in England—several buses of this type were used in London—he should be able to get the necessary spare parts.

Yours faithfully,
Ommen, Holland. M. M. FLUHUCK.

A Home-made Two-stroke Engine.

DEAR SIR,—After reading the description of a home-made two-stroke engine in the July 5th issue of the "M.E.," I feel that I must relate my first attempt at making a model petrol engine, and incidentally my first attempt at moulding and casting. I turned my cylinder from a scrap piece of 1½ in. O.D. ⅞ in. bore steel tube; the faces for the transfer port cover and exhaust pipe were brazed on after turning the fins. I tried to cast the piston and cylinder head in plaster of Paris, using a wax pattern, but although I got one cylinder head, it was very troublesome and uncertain, so I decided to try to obtain castings in the orthodox way. I made some wood moulding boxes, obtained some sand and parting sand from a local foundry, made wooden patterns and set about trying to obtain castings. After two tries I succeeded in obtaining a good cored out crankcase casting, cylinder head (with fins), mixing valve body, and transfer port cover all at one pouring, using scrap car crankcase and gearbox metal, melted over a forge described about 18 months ago in "ours," blown by the vacuum cleaner. If I now want any castings in aluminium or brass, I simply make my pattern, mould it up, and cast them, often doing the whole lot in one evening in the case of small parts like pulleys, timing case covers, etc. I never use an open mould; a double moulding box is nearly as simple and gives a much sharper and cleaner casting. My criticism of Mr. H. Ward's method is this: After having taken the trouble to make his patterns and obtaining moulding sand, why not knock together a wooden two-part moulding box—it wouldn't take an hour—and obtain castings far superior to open mould castings?

Regarding the editor's comment, I wonder exactly how long the crank disc will reign? From experience with my own engine, which is only 14.8 c.c., I should say it would not last a quarter of an hour (a plain brass big end bush lasted 16 minutes in my engine). The disc will slip round the shaft. My crank disc is steel, fitted on a 10° taper and drawn up by a nut, but even then I had difficulty in stopping slip, and I am absolutely certain that a friction fit like the casting of aluminium over steel will not stand up against the sudden stress due to an explosion in the cylinder.

My engine, based on Westbury's "Atom III," is fitted in a model aeroplane similar to Captain Bowden's "Bee." It is fitted with a scaled down copy (approx. ⅔ size) of Westbury's "Atom III" float feed curburettor with slow-running jet, compensated main jet and butterfly throttle. This carburettor added 30 per cent. more power than the mixing valve first fitted. The new curburettor weighs 1⅜ ozs. (is this a record for a fully automatic compensated float feed carburettor?) and enables my engine to develop a 3 lb. 1 oz. static thrust, using a 17½ in. diameter 14 in. pitch propeller. The thrust is measured by hooking a spring balance behind the fuselage. I made my own coil and condenser, weight 7½ ozs., and everything else except the plug. The total cost of the engine, ignition gear, and 'plane complete came to under 15s., the most expensive items being a sparking plug, 3s. 6d.; silk remnants from a stall in the market, 5s. 6d.; scrap aluminium, 6d.; and two Woolworth's rubber-tyred ash trays; all the rest was made from scrap lying about.

The 'plane is an absolute success and I have had dozens of successful flights, occasionally to an altitude of 300 ft. when conditions allowed half a minute of full throttle. Its full throttle climb is like that of an elastic-driven lightweight.

Yours faithfully,
Chesterfield S.M.E. P. W. PEARSON.

Model Marine Engines.

DEAR SIR,—I have been interested by Mr. Rae's letter on the above subject. Mr. Rae seems to lament the absence of articles on practical marine engineering matters. May I suggest that this is due to the fact that experience and knowledge tend to make a man wary of committing himself, and, like the angels, "fears to tread, etc." The matter of the air pump and condenser on a small scale is a particularly knotty point, especially on the scale Mr. Rae mentions. For small engines, other than marine, I have found the Edwards' air pump fairly satisfactory, but have enlarged the openings at the bottom to 50 per cent. more than the scale would give, to advantage. The time is so small during the period allowed for filling, that only the flush due to the descent of the bucket driving the air and water into the barrel could enable it to function.

For engines with cylinders about 1 in. dia. or more, the task is simpler, provided the pump is kept low. In the case of the surface condenser, the barrel of the air pump should be extended to come below the bottom of the condenser. Except for the reason that the pump bucket does not act so well when not "water sealed," I should try making the top part of the pump to extract the air, and the lower part the water. I have found nothing quite so efficient as the vertical single acting bucket pump with metal valves.

I have turned up Mr. Beilschmidt's article. The least fault of the pump shown in Fig. 1 is that there is not room athwart a steamer to get it in. The same thing might be said of Fig. 2 intended, I presume, to be part of a horizontal engine, but to state that the pump would be totally submerged is to confess an utter lack of knowledge of the subject.

The circulating pump is a simpler matter, and can be driven direct either from the air pump lever or else by means of a separate lever driven from one of the crossheads.

I have found that you can exhaust just in front of the screw propeller to advantage without back pressure and without any visible steam. In the case of the paddle a good place to exhaust is below the paddle shaft and above the water line. No trace of steam comes through the splash of the paddle.

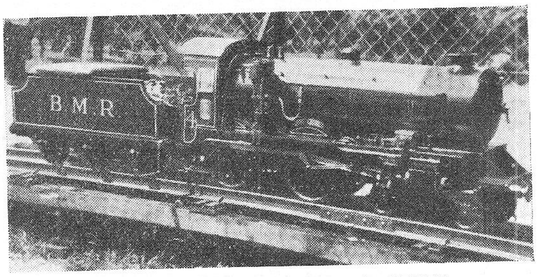
For large marine engines an ejector (steam) has been used, with success, between the condenser and the air pump, extracting the air from the upper part of the condenser.

Yours faithfuly,
H. MUNCASTER.

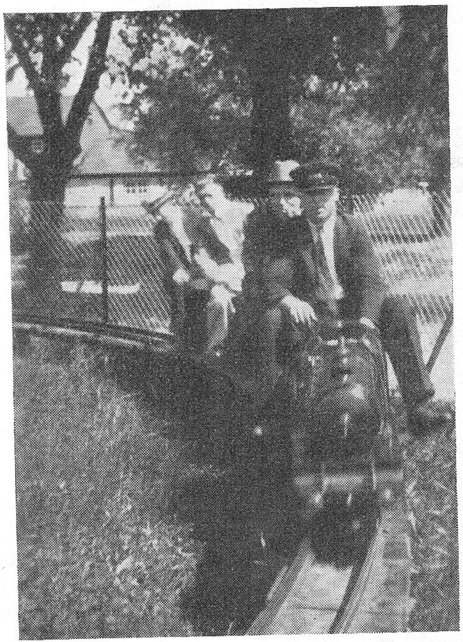
Church Stoke, Montgomery.

A Bedford Miniature Railway.

DEAR SIR,—Readers in or near Bedford may be interested to know of a miniature railway open to the public and situated in Mill Fields, quite near to the light suspension bridge that spans the river. The track is 7¼ in. gauge and 60 feet in diameter, with regulation pattern rails and steel sleepers. At present only one loco. is running, a Southern Railway "Schools" class 4-4-0, made and owned by Mr. W. J. Gower, who is in business as an engineer and boiler maker at Bedford. The boiler is of steel plate 9/32 in. thick, tested to over 200 lbs. per sq. in., and blows off at 100 lbs. Mr. Gower explained to the writer that he made the boiler of heavy gauge plate to get weight on the drivers. Fuel is just ordinary wood and coal, and steam can be raised in the first instance by draught from an extended chimney and a compound motor tyre pump, and afterwards by the blower in the usual way. Two injectors are fitted, one low and one high pressure, and also a double acting feed pump of Mr. Gower's own design and construction. The two cylinders, each 2¼ in. bore, were made from steel tube and arc welding, and flat D valves are used with Walschaerts gear. A fine whistle is used, and this gets going at once without those preliminary wheezes and coughs so common to most small locos. After the writer and a friend had taken a hand at the pump, we had several runs round. The track is too small to allow of much speed, but the riding is perfect and Mr. Gower stated that he could haul 22 adults easily. The boiler is insured, and for that reason no one is allowed to drive except the owner and his man. For the photos, the writer is indebted to Mr. Elstow, of Bedford, who is engaged on a model traction engine from Mr. Greenly's designs. The miniature railway was opened on Saturday, July 7th last, by the Mayor of Bedford. Both he and the Lady Mayoress enjoyed the run round so much that they nearly ran the boiler out of water, to the alarm of Mr. Gower.



The "Schools" type loco on the B.M.R.



A trip on the Bedford Miniature Railway.

Yours faithfully,
Luton. E. W. FRASER.

Ground Thread Taps.

DEAR SIR,— I am very interested in Mr. G. C. Orpet's letter on this subject in the July 12th issue.

Ground thread taps are made as small as 2BA to my definite knowledge, and I believe I have seen them as small as 4BA. They are made by at least three well-known firms; one is a firm famous for its slip gauges, and another equally famous for its ball and roller bearings. I do not know how they are made, but given the right type of machine I see no reason why it should not be possible to grind the smaller sizes. It must be borne in mind that grinding wheels produced to-day are greatly superior to those supplied even a few years ago. Many grades keep their " form " almost indefinitely.

In practice I have found these taps very pleasant to use, and the best makes are definitely " relieved " or " backed off " on the thread.

Mr. Orpet suggests that if a tap is slightly inaccurate it should cut more freely. I assume he refers to pitch error. This may be so whilst the top is new, but he must remember that only a few cutting edges will be doing their share of cutting, and that they will become dull very quickly. In certain circumstances he will find that the heel of the thread (trailing edge) will be " rubbing," and will eventually bind, or worse still, " dig in " on reversal, and break.

With regard to the relief obtained, I am inclined to think that the grinding machine is similar to a "relieving lathe" as used for making profile milling cutters.

On this type of lathe the top slide can be caused to move backwards and forwards slightly, any number of times per 1 rev. of the mandrel to suit the number of teeth in the cutter being relieved.

The relief on the taps appears to be only a few tenths of a thou. on four-flute taps.

The taps I have handled (¼ Whit. upwards), are made of high speed steel, and stand up wonderfully well, considering we use them for tapping such steels as "Cook's K Special," and a brand we know as "NRW." The latter has to be tapped *dry*, and is used for heavy duty press tool dies and punches.

Yours faithfully,

London, W.11. J. P. McKenna.

Another Brazing Mishap.

Dear Sir,—The letter headed "A Brazing Mishap" in your issue dated July 26th reminds me of a similar experience, but in this case I was operating with some old bricks as a support. When the heat was going good and strong there was a blinding flash and for the moment I thought I had been blinded. Actually I was afraid to open my eyes.

However, I suffered no personal injury, but I must have been lucky, because there was little or no signs of any brazing operation having been in progress—the work, coke and bricks were blown sky high.

I have no doubt that the cause of the trouble was moisture in the bricks, as my workshop at that time was in a damp, very damp, cellar. Yours faithfully,

Sutton. P. G. Tucker.

Institutions and Societies.

Institute of Patentees.

We are informed that the Institute of Patentees has removed its offices to 10, Victoria Street, Westminster, S.W.1. No change has been made in telephone numbers or telegraphic address. The Institute is now able to offer to inventors and patentees many more facilities, including writing and reading rooms. There is also sufficient space to arrange in the future, laboratories and workshops.

Croydon Society of Model Engineers.

Our next meeting will he held on August 13th at 8 p.m. at Clyde Hall, Clyde Road, Addiscombe, and is model and track night.

H. W. Clements, Hon. Sec. and Treas., 14, Constance Road, W. Croydon.

West Wiltshire Model Engineering Club.

A regatta by members of the Swindon Power Boat Club is to be given under the auspices of the above club on the afternoon of Saturday, August 11th, in the Park Lake, at Trowbridge, Wilts. All interested are cordially invited to attend.

Secretary: W. H. McCreary, Belcombe Croft, Bradford-on-Avon.

West London Model Power Boat Club.

The above club held a steering competition on Sunday, July 22nd. This day was, I think, the hottest day we have had, and there being very little wind to worry us, proved to be a good one. The marking buoys went out first shot in a good straight line and the day began with Mr. Lambert's cargo-boat "Ennismore" taking the first run, and he was very unfortunate in fouling a large piece of floating paper, but eventually did so well as to make a tie with the "Mary Dean" for the first place. This tie was run off twice before the winner was proved, and the "Ennismore" had to take second place as the "Mary Dean" scored a bull against the "Ennismore's" inner. In answer to Spectator's enquiries, I must say that "Old Bill" is now recovered and does even better with his boat than ever. He had two collisions with yachts during this steering competition, fortunately not doing any damage to them, and I trust without having spoilt the amity that is now established between our respective clubs.

Anyone interested in the club and its activities may obtain further particulars from the Secretary, S. Holtorp, 8, Stowe Road, Shepherds Bush, W.12.

"M.E." Spare Time Problems.

No. 14.—Time to Strike Time.

If a clock takes six seconds to strike six, how long does it take to strike eleven?—(Solution next week.)

Notices.

The Editor invites correspondence and original contributions on all small power engineering and electrical subjects. Matter intended for publication should be clearly written on one side of the paper only, and should invariably bear the sender's name and address. Unless remuneration is specially asked for, it will be assumed that the contribution is offered in the general interest. All MSS. should be accompanied by a stamped envelope addressed for return in the event of rejection. Readers desiring to see the Editor personally can only do so by making an appointment in advance.

All subscriptions and correspondence relating to sales of the paper and books to be addressed to Percival Marshall and Co., Ltd., 13-16, Fisher Street, London, W.C.1. Annual Subscription, £1 1s. 8d., post free to all parts of the world. Half-yearly bound volumes, 11s. 9d. post free.

All correspondence relating to Advertisements and deposits to be addressed to The Advertisement Manager, "The Model Engineer," 13-16, Fisher Street, W.C.1.

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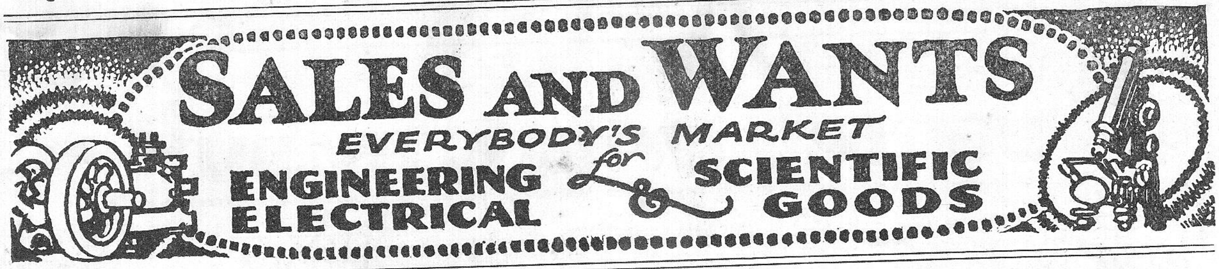

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"Eureka" Air Compressors. Sets Castings, Drawings and all material to make this fine useful compressor, 10s. 6d.; finished machine, £2 2s. See article in March 29th issue.—POYSER, Peck's Hill, Mansfield.

Case-Hardening and Heat Treatment. Send your inquiries to. — KASENIT LTD., the recognised specialists, Henry Street, Bermondsey, S.E.1.

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Printing Presses, 7s. 6d. each; Hand Rollers, 6", 1s.—10, Otley Road, Harrogate.

Electric Motor, 2 h.p. 200v. D.C., 1,750 revs., ball bearings, complete as new, with starter, fuses and main switch, £3 10s.—MARTIN, 60a, Boleyn Road, East Ham, E.6.

The August number of "Steam Car Developments and Steam Aviation" is of special interest, don't miss it. Contents: 8 Cylinder Steam Rotary, illustrated, Proposed Steam Car Club, 2 Modern Steam Car Generators, illustrated, The Cremorn Paraffin Burner, illustrated, The New Henshel Steam Omnibus (continued), Steam in the Air, correspondence. Published monthly 9d. post free by.—R. H. & H. W. BOLSOVER, Castle Road, Whitby.

Exchange Kodak Folding Camera, 3a, with portrait lens, 3 "DD" slides, focussing screen, sling carrying case, perfect condition, cost £8, for good microscope.—99, Stonefall Avenue, Starbeck, Harrogate.

30s., New Unused Rotary Pumps, with pulleys, 800 g.p.h., on approval, carriage paid.—JOHN QUICK, Bampton, Oxon.

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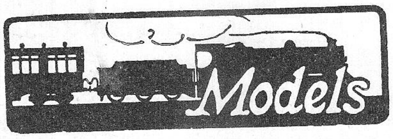
Cinematograph Films and cheap British made Machines, Accessories. Lists free.—"FILMERIES," 57, Lancaster Road, Leytonstone.



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"Pioneer" Castings and Parts, machined or rough. Stamped envelope for list.—FENN, 2a, Charles Place, Drummond Street, London, N.W.1.

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$2\frac{1}{2}$" "Lady Kitty," Usual Specification plus mechanical oil pump, Weir donkey pump, thorough good worker, any trial, £20.—MARCHANT, 52, Blanmerle Road, New Eltham.

30 c.c. Hydroplane, Grayson Type, ball-bearing engine, Stuart ignition, 24 m.p.h., sacrifice £5; Set Atom 3 castings, 15s.; Horizontal Steam Engine, 1 5/16" × $2\frac{1}{8}$", Walschærts, illustrated "M.E." April 28th, 1932, Diploma winner, lovely condition, £6 approval.—KERSWELL, 144, Burchells Green Road, Kingswood, Bristol.

The "Little Wonder" 15 c.c. Lightweight, float feed, carburettor, with needle-jet, at 12s. 6d. is the world's best.—"CARBURETTORS," 330, Kingston Road, London, S.W.20.

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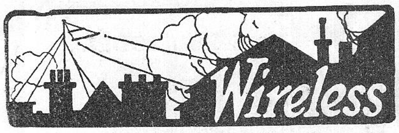

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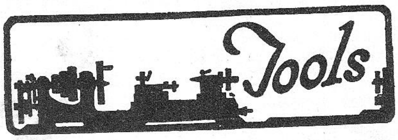

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Lathes, Power and Treadle, by all the leading makers, in stock. Send your inquiries.—Ross & Alexander, (London), Ltd., 163, Bishopsgate, E.C.2.

Wade Lathe Screwcutting Attachment, 15s., post 1s. 3d. extra.—Aird, Gardner Street, Brighton.

Milling Attachments, Dividing Heads, Circular Tables.—Wheeler Co., Ltd., Trench, Wellington, Shropshire.

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"Ajax" Welding Plant, only cost £12 10s. profitable investment.—Greenwood, Arnside Road, Southport.

Lathes for Treadle and Power, 6" centres, admit 30", chuck, etc., cheap.—Bell, Walter Street, Leeds.

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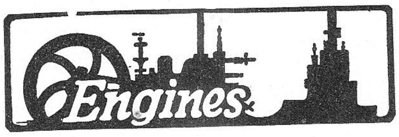

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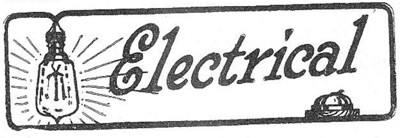

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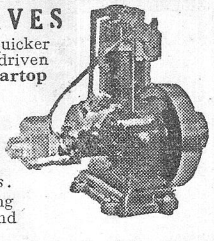

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August 12th.—Lancashire Model Aircraft Society. Annual Open Competitions Day, Woodford Aerodrome, Cheshire, 12.30 p.m. to 5.30 p.m. Last date for receiving entries 5th August.

August 12th.—Model Power Boat Association. Fleetwood Regatta, at Fleetwood, Lancs.

August 12th.—S.M.A.E. Pilcher Cup (Duration) at Blackheath at 3 p.m.

August 19th.—Model Power Boat Association. Farnborough Regatta at Cove Reservoir.

August 19th.—Lancashire Model Aircraft Society. Junior Cup Competition.

August 25th.—T.M.A.C. Seaplane Contest (Rise off Water) at Danson Park, Bexley Heath.

August 26th.—S.M.A.E. Sir John Shelley Cup (Power Driven, any type) at Fairey's Great West Aerodrome at 3 p.m.

August 26th.—The Model Power Boat Association. Stretford Regatta at Wilmslow Lake, near Manchester.

August 26th.—T.M.A.C. Power Contest. Fairey's Great West Aerodrome.

September 2nd.—Model Power Boat Association. Wicksteed Regatta, at Wicksteed Park, Kettering.

September 6th-15th.—Model Engineer Exhibition, at the Royal Horticultural Hall, Westminster, S.W.1.

September 15th.—S.M.A.E. Lady Shelley Cup (Seaplane) at Danson Park, Bexley Heath at 3 p.m.

September 16th.—Model Power Boat Association. Grand Regatta at Victoria Park, London.

September 20th.—S.M.E.E. Competition, Track and Model Night.

September 30th.—S.M.A.E. C.S.S.A. Cup (Speed), at Golders Green, at 10 a.m.

October 6th.—S.M.A.E. Freshmen's Competition at Wimbledon, at 3 p.m.

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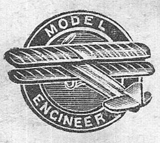

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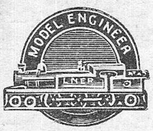

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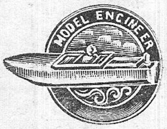

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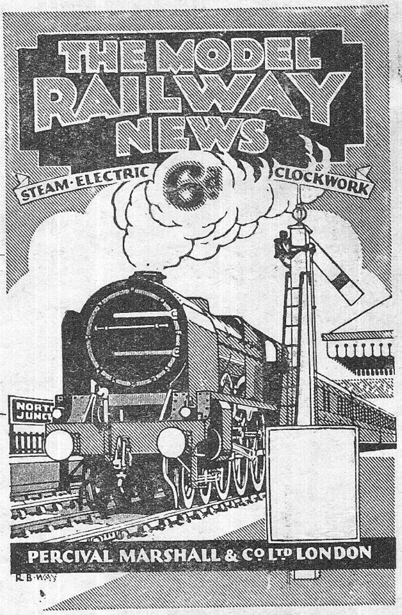

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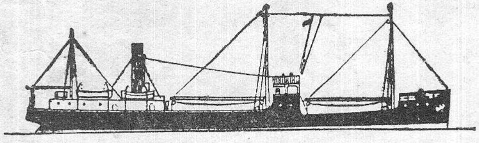

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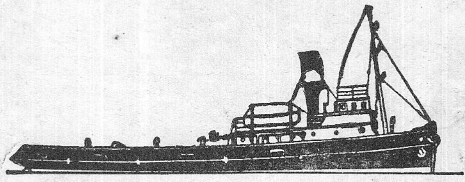

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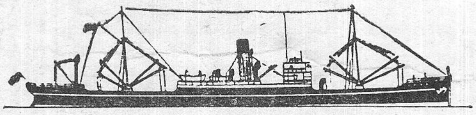

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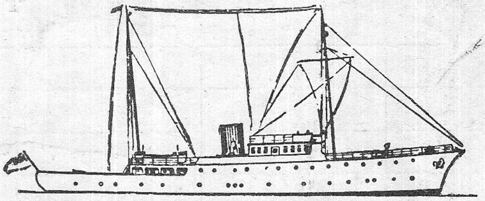

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